O.T. 1930 ORIGINAL NOS. 8, 10 & 11.

Office Supreme Court, U. S.
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IN THE

Supreme Court of the United States

OCTOBER TERM, A. D. 1925.

Number 7 Original in Equity.

7

STATES OF WISCONSIN, MINNESOTA, OHIO AND PENNSYLVANIA,

Complainants,

VS.

STATE OF ILLINOIS AND THE SANITARY DISTRICT OF CHICAGO,

Defendants.

ANSWER OF DEFENDANT, THE SANITARY DISTRICT OF CHICAGO, TO THE AMENDED BILL OF COMPLAINT.

HECTOR A. BROUILLET,
Attorney, The Sanitary District of Chicago.

GEORGE F. BARRETT,
EDMUND D. ADCOCK,
LOUIS J. BEHAN,
MORTON S. CRESSY,
Solicitors for Defendant, The Sanitary District of Chicago.

BARNARD & MILLER PRINT, CHICAGO

IN THE

Supreme Court of the United States

October Term, A. D. 1925.

Number 16 Original in Equity.

STATES OF WISCONSIN, MINNESOTA, OHIO AND PENNSYLVANIA,

Complainants,

vs.

STATE OF ILLINOIS AND THE SANITARY DISTRICT OF CHICAGO,

Defendants.

ANSWER OF DEFENDANT, THE SANITARY DISTRICT OF CHICAGO, TO THE AMENDED BILL OF COMPLAINT.

This defendant, The Sanitary District of Chicago, by Hector A. Brouillet, Attorney, The Sanitary District of Chicago, George F. Barrett, Edmund D. Adcock, Louis J. Behan and Morton S. Cressy, its solicitors, reserving to itself all right of exception to said amended bill of complaint, for answer thereunto alleges, avers and says, as follows:

(1) This defendant admits that the States of Wisconsin, Minnesota, Ohio and Pennsylvania are, and each of them is one of the, states of the United States of America, and that they bring this action in this court as such states of the United States of America.

(2) This defendant admits that the State of Illinois is one of the states of the United States of America, and the defendant The Sanitary District of Chicago is

a public municipal corporation organized and existing under and by virtue of the laws of the State of Illinois, and is a citizen of Illinois.

(3) This defendant denies that a controversy exists between the said complainants and the defendants cognizable in this court and over which this court has jurisdiction. These defendants aver that the matters and things, in the said amended bill of complaint set forth and upon which the said complainants seek relief, relate to the regulation of the Great Lakes System of Waterways and the channels and harbors connected therewith, including the channels and harbors located along the shores of the Great Lakes; that the said Great Lakes system of waterways, channels and harbors connected with it, are interstate or national waters, over which the United States has and has assumed exclusive jurisdiction; that the said supposed interference with navigation, in said amended bill of complaint alleged, upon said Great Lakes system of waterways and harbors and channels connected with it due to the supposed acts and doings of the said defendants, or one of them, can be complained of, if at all, only by the United States, and that the United States is a necessary and indispensable party. For the reasons in this paragraph stated, this defendant does now hereby move that the said amended bill of complaint be dismissed.

Third. This defendant admits that the action is brought in the Supreme Court of the United States in the exercise of the original jurisdiction of said Court, on the claimed ground that it is an action in equity relating to an alleged controversy between two or more states of the United States and also between States of the United States and a citizen of another State.

Fourth. This defendant admits that the State of Wisconsin has approximately 350 miles of shore line

along Lake Michigan, and that along said shore line are thirteen harbors but this defendant denies that said harbors or any of them are included in said shore line and aver that none of them are intrastate waters. This defendant admits said harbors have facilities for loading and unloading of vessels navigating the said Lake Michigan and other Great Lakes. This defendant admits that the said harbors are as follows: Milwaukee, Manitowoc, Green Bay, Sheboygan, Marinette, Racine, Kenosha, Port Washington, Kewaunee, Algoma and Sturgeon Bay. This defendant is not informed as to the total amount of freight received at and shipped from the said thirteen harbors during the year of 1923, exclusive of freight received and shipped by car ferry, and therefore ask strict proof, so far as the same may be material or relevant, as to the amount of such tonnage during the said year of 1923, or any other year or years that may be designated. This defendant is not informed as to whether or not the State of Wisconsin has approximately 150 miles of shore line along Lake Superior, but admit that along said shore line of Wisconsin are the harbors of Duluth-Superior, Port Wing and Ashland. This defendant is not informed as to what the total traffic of said harbors was in the year of 1923. This defendant denies that all of said harbors are in or within said shore line and aver that none of them are intrastate waters. This defendant respectfully shows that the allegation as to the shore line of the State of Wisconsin along the shore of Lake Superior and the harbors of Wisconsin on Lake Superior, and the total traffic on said harbors on Lake Superior is immaterial for the reason that the amended Bill of Complaint does not allege that the alleged diversion of water at Chicago from Lake Michigan has had or could have had any effect upon said harbors situated on Lake Superior.

Fifth. This defendant is not informed as to whether or not the State of Minnesota has approximately 75 miles of shore line along Lake Superior but admit that along the short line of Minnesota are the harbors of Duluth-Superior, Grand Marais, Warroad, Zippel Bay and Baudette. This defendant denies that all of said harbors are in or within said shore lines and avers that none of them are intrastate waters. This defendant is not informed what the combined tonnage in said harbors was during the year of 1923, but this defendant respectfully shows unto the Court that the allegation as to the shore line of the State of Minnesota along the shore of Lake Superior and the harbors of Minnesota on Lake Superior, and the total traffic on said harbors on Lake Superior is immaterial for the reason that the amended Bill of Complaint does not allege that the alleged diversion of water at Chicago on Lake Michigan, has had or could have had any effect upon said harbors situated on Lake Superior.

Sixth. This defendant admits that the State of Ohio has approximately 230 miles of shore line along Lake Erie and that along said shore line are the harbors of Toledo, Put-In-Bay, Marblehead, Kellys Island, Port Clinton, Sandusky, Huron, Vermilion, Lorain, Cleveland, Fairport, Ashtabula and Conneaut. But this defendant denies that all of said harbors are located in or within said shore line and aver that none of them are intrastate waters. This defendant is not informed as to the tonnage of said harbors, exclusive of freight received or shipped by car ferry during the year 1923, and therefore ask strict proof, so far as the same is material, as to the amount of such tonnage during the said year of 1923, or any year or years that may be designated.

Seventh. This defendant admits that the State of Pennsylvania has approximately 40 miles of shore line

along Lake Erie, and that along said shore line is the harbor of Erie. This defendant denies said harbor is located in or within said shore line and aver that said harbor is not intrastate water. This defendant is not informed as to the total amount of freight received at or shipped from said harbor, during the year of 1923, and therefore asks strict proof, so far as same is material, as to the amount of such tonnage during the year of 1923 or any other year or years that may be designated.

Eighth. This defendant admits that the State of Illinois has approximately 60 miles of shore line along Lake Michigan, comprising the eastern boundary of the counties of Lake and Cook in said State.

This defendant admits that there exists and has existed a stream of water connected with Lake Michigan, known as the Chicago River, extending from Lake Michigan westerly for approximately a mile in the City of Chicago, and that one branch, known as the North Branch of the Chicago River, extends north from said point, and that another branch of said Chicago River extends in a southerly and southwesterly direction, known as the South Branch of the Chicago River, and that there extends from the said South Branch in a westerly direction what is known as the West Fork of the South Branch, and in a southerly direction what is known as the South Fork of the South Branch of the Chicago River. But this defendant denies that at all times up to the year 1900, the said Chicago River and its various branches above mentioned, flowed into Lake Michigan.

This defendant avers that beginning with the year 1848, by reason of the construction of the Illinois and Michigan Canal and its enlargement thereafter, during a large part of each year a large amount of water finding its way into the Chicago River and the various branches

above mentioned did not flow into Lake Michigan, but flowed through the said Illinois and Michigan Canal to the Desplaines, thence to the Illinois and Mississippi Rivers.

Ninth. This defendant admits that the General Assembly of Illinois passed an act entitled "An Act to create Sanitary Districts and to remove obstructions in the Desplaines and Illinois Rivers," approved May 29, 1889, in force July 1, 1889, as is alleged in paragraph 9 of said amended bill of complaint, and that sections 23 and 24 of said act are set forth *in haec verba* in paragraph 9 of said amended bill of complaint. And this defendant avers that the said entire act and various acts passed as amendments of or supplementary to said original act, are set forth as Exhibits A, A1, A2 and A3, to the answer to the original bill herein, which said exhibits, including the other exhibits to the answer to said original bill, are made a part of this answer the same as if set forth *in haec verba* herein.

Tenth. This defendant admits that in November and December of the year 1889, the Sanitary District of Chicago was organized under the said act of 1889, hereinbefore referred to, and that it has since continuously existed as said Sanitary District under said act of 1889. and acts amendatory thereof and supplementary thereto. This defendant admits that at the time of its organization, said defendant District consisted of a territory of about 185 square miles in area. This defendant admits that by successive acts of the Legislature of Illinois, the area of said defendant District has been increased from time to time, and that the area of said Sanitary District now comprises approximately 438 square miles, extending from the Illinois State line on the South and East to the Northern boundary of Cook County on the North, with about 34 miles of front-

age on Lake Michigan and comprises the entire City of Chicago and approximately 49 other cities and villages located near said City of Chicago, together with large areas of land to the South, West and North of said City. This defendant avers that Exhibit B to the answer to the original bill shows the territorial limits of defendant district at various times and also the various diversion works of said defendant.

Eleventh. This defendant admits the allegations of paragraph 11 of said amended Bill of Complaint with reference to the construction of the main channel of the Sanitary District, except as to the time when said construction was commenced. As to such allegations this defendant avers that the construction of the main channel of said Sanitary District of Chicago was commenced during the year of 1890 and long prior to said 3d day of September, 1892.

Twelfth. This defendant denies that in the construction of said canal it was at all times, or that it is now, the plan of defendant that said canal should be used as a passageway for the sewage of the territory comprising The Sanitary District of Chicago, as, and in the manner, alleged in paragraph 12 of said amended bill; and avers that it never was, and is not now, the intention of this defendant to use said canal in any manner, or to divert water from Lake Michigan, except as authorized or permitted by the United States; and admits that section 20 of the said act of the General Assembly of 1889, by which the Sanitary District was organized, was amended in 1895 by the General Assembly of Illinois as is in said paragraph alleged, but this defendant avers that without said amendment said section of said original act provided for the diversion and flow continuously through the main channel of "at least 200 cubic feet per minute for each 1,000 population of the

district drained thereby," which is equivalent in amount to 20,000 cubic feet per minute for every 100,000 population, which is the specification contained in the 1895 amendment referred to in said paragraph 12.

Thirteenth. This defendant admits the allegations of paragraph 13 of said amended Bill of Complaint except as to the date when the main channel of the Sanitary District was opened, and avers that said main channel was opened on January 17, 1900.

Fourteenth. This defendant denies that the primary object and purpose of the Act of 1889, as alleged in said amended bill of complaint, was to provide a method of disposing of the sewage of the City of Chicago and contiguous territory, but admits that that was one of the objects and purposes of said act; and this defendant avers in this respect that the principal object or purpose of the said Act of 1889 was to provide for the construction of a ship canal to connect the Chicago River with the Desplaines and Illinois Rivers, and for the construction of other canals and waterways connected with it, and to provide for the quantity of water necessary for navigation upon the said ship canal and upon the Desplaines and Illinois Rivers, and to further carry out the plan and program of the State of Illinois for the construction of a deep waterway between the Great Lakes and the Mississippi River in accordance with various acts of Congress and acts of the State of Illinois, as hereinafter more specifically set forth.

This defendant admits that by the said Act of 1889 and acts amendatory and supplementary thereto, it is the legal duty of the defendant Sanitary District of Chicago, subject to the authority and permission of the United States, to pass through said canal water at the rate of 20,000 cubic feet per minute, or 33⅓ cubic feet per second, for every 100,000 inhabitants within the territory

of the defendant Sanitary District of Chicago, and that the only source from which said quantities of water may be obtained was by the diversion of water from Lake Michigan.

This defendant avers that at the time of the passage of said Act of 1889, the Congress of the United States had not passed any act or acts by which it had assumed or had sought to assume general regulation of navigable waters of the United States; that the General Assembly of Illinois, in passing said Act of 1889 providing for said diversion in the amounts required according to population of the said Sanitary District, believed that it was acting not only in pursuance of the express power granted by Congress under the Acts of Congress of March 30, 1822, and March 2, 1827, relating to the construction of the Illinois and Michigan Canal hereinafter more particularly mentioned, but also in pursuance of the power then existing in the State of Illinois to regulate its navigable waters; that the said Act of 1895 above mentioned and as heretofore alleged, did not change in any respect the intent of the Legislature of Illinois as expressed by said Act of 1889 with reference to the quantity of water according to population of the Sanitary District of Chicago to be diverted from Lake Michigan; that upon the passage of the Rivers and Harbors Act of September 19, 1890, and The Rivers and Harbors Act of March 3, 1899, under which the Congress of the United States assumed jurisdiction to regulate generally navigable waters of the United States, the said defendant The Sanitary District of Chicago, in exercising the power and authority granted by the said Act of 1889 and acts amendatory thereof and supplementary thereto, sought to act and did act, at all times, in conjunction with and by the authority of the United States according to law.

This defendant admits that the population of the

territory of the Sanitary District of Chicago according to the census of 1920, was 2,963,090, and admits that the said Act of 1889 of the General Assembly of Illinois and acts amendatory thereof and supplementary thereto, require the diversion of water from Lake Michigan at the rate of approximately 9,876 cubic feet per second; but this defendant avers that it cannot divert said quantity of water and does not intend to divert said quantity of water or any other quantity, except by and with the authority of the United States according to law.

Fifteenth. This defendant admits that subsequent to the opening of said canal, and in the year 1903, the defendant State of Illinois, by an act of its legislature approved May 14th, 1903, and published in the Laws of Illinois for the year 1903, commencing on page 113, undertook to authorize and did authorize the defendant, the Sanitary District of Chicago, to construct and operate a plant for the generation of electrical energy by hydraulic power derived from the water passing through the said canal. The provisions of sections 5 and 6 of said act are set forth *in haec verba* in said paragraph 15 of said amended Bill of Complaint.

Sixteenth. This defendant admits the allegations of paragraph 16 of said amended Bill of Complaint, with reference to the construction and operation of the hydroelectric power plant at Lockport, Illinois, and the capacity thereof; that the electrical energy thus generated is mainly transmitted to the City of Chicago and there sold for municipal and commercial purposes; but denies that the operations of said plant have earned for the Sanitary District of Chicago, many millions of dollars of profit over and above the cost of operating said plant, including proper allowance for depreciation and a reasonable return upon the investment therein.

Seventeenth. This defendant denies that since the

completion of said hydro-electric development near the western terminus of said canal, the object and purpose of the defendant in the operation of the said canal and in the diversion of water from Lake Michigan through the same has been and is now two-fold, to-wit: The disposition of the sewage of the defendant Sanitary District of Chicago, and the generation and sale of electrical energy as alleged in paragraph 17 of said amended Bill of Complaint. This defendant avers that the amount of water diverted from time to time has been and is reasonably necessary for the purposes of navigation and is as near as may be determined the amount provided to be diverted according to law; that at no time has the mean daily, or mean monthly, or mean yearly flow or diversion exceeded that amount; that prior to the construction of the said hydro-electric plant, the energy produced by said water as it passed from the southern terminus of the said main channel to the Desplaines river was entirely wasted and served no purpose; that the only purpose of constructing and operating said hydro-electric plant was to conserve this energy; that said energy so produced has been and is used for the purpose of lighting the streets of the City of Chicago and its suburbs, and also for lighting the boulevards and parks of the various park systems of Chicago according to law; and that the energy so used for such public purposes has been and is sold at approximately the cost of production.

Eighteenth. This defendant denies the allegations of said amended bill of complaint contained in paragraph 18 thereof in respect to the mean yearly amount of water passing through said Sanitary District Canal at its western terminus for the years 1900 to 1917, both inclusive, and denies that the statements of said amended bill of complaint with respect to said amounts are correct, but avers that the said mean yearly amount of water

(including drainage) passing through said Sanitary District Canal at its western terminus for said years, and in addition for the years from 1918 to 1924, both inclusive, is as follows:

Year	*Cubic Feet Per Second*
1900	2,990
1901	4,046
1902	4,302
1903	4,971
1904	4,793
1905	4,480
1906	4,473
1907	5,116
1908	6,443
1909	6,495
1910	6,833
1911	6,896
1912	6,938
1913	7,839
1914	7,815
1915	7,738
1916	8,200
1917	8,726
1918	8,826
1919	8,595
1920	8,346
1921	8,355
1922	8,858
1923	8,348
1924	9,465

Nineteenth. This defendant admits that all the water diverted from Lake Michigan by the defendant through and by means of the Sanitary District channel, is carried into the Mississippi Valley; that said water is permanently abstracted from the Great Lakes system, but deny that, as the result of such diversion, the mean level of the water in Lake Michigan, Huron, Erie and Ontario, and in the various waterways connecting said lakes, and in the St. Lawrence River above tidewater, has been lowered six inches below the level that

would exist in said lakes and waterways in the absence of such diversion. This defendant avers that the lowering of the surface elevation of the waters of said lakes and their connecting channels as a result of said diversion or diversions as authorized by said permit of March 3, 1925, does not and will not exceed four and three-quarters inches on any of said lakes or waterways; and this defendant avers that it does not intend to divert any amount of water in excess of that authorized by the United States.

Twentieth. This defendant denies the allegation of said amended bill to the effect that at no time during the period of at least ten years last past has it been necessary for the protection of the health of the people of defendant district, or for any other purpose, that the sewage of the Sanitary District of Chicago be disposed of by means of said canal; and this defendant denies that it has been entirely feasible during all of said period, or is now feasible for said District to adopt and use the so-called scientific methods of sewage disposal, such as are alleged in said paragraph 20 of said amended bill, beyond the extent such methods are now or are provided to be employed by said permit of March 3, 1925 and adopted by defendant District; and that such methods are in practical and successful operation in many of the large cities throughout the world. This defendant denies that the use of the so-called scientific methods would require no diversion of water from Lake Michigan. This defendant denies that there is in successful operation for a large metropolitan population such as exists in Chicago and its suburbs and surrounding urban communities, so-called artificial or scientific sewage purification works that do not have as a basis the disposition of sewage by the so-called dilution method of sewage disposal provided for by the diversion works of the Sanitary District of

Chicago. This defendant avers that the flood flow of the Chicago River is approximately 10,000 cubic feet of water per second, and that unless there is permitted to be withdrawn 10,000 cubic feet of water per second at times when the rain is falling on Chicago area, the Chicago River will flow back into Lake Michigan, carrying with it the sewage of the City of Chicago, and thereby Lake Michigan will become polluted, a situation which actually existed prior to the opening of the Sanitary District canal in 1900, so that the flow of water as authorized in the Federal permit of March 3, 1925, of 8500 cubic feet per second annual average with instantaneous maximum of not to exceed 11,000 cubic feet per second, was and is necessary in order to prevent the sewage and drainage of the Chicago River Drainage basin from flowing into and polluting the water of Lake Michigan. This defendant avers that within the period of the said permit of the Secretary of War of March 3, 1925, set forth in said amended bill of complaint and above mentioned, it would not only be impossible to provide from public funds the moneys necessary, but also it would be physically impossible if moneys could be provided, to construct so-called scientific disposal works to take care of the sewage of the population of the territory of defendant The Sanitary District of Chicago, so that the water supply of the people of the Sanitary District would not be polluted without the diversion of the amount of water authorized by said permit of March 3, 1925. This defendant avers that until recently the art of sewage disposal by so-called scientific means other than solely by dilution, has been in a state of change; that the defendant The Sanitary District of Chicago has expended upwards of $500,000 in experimenting and in studying methods of sewage disposal used or attempted

to be used in various parts of the United States and in Europe, and with reference to the adaptation of such methods to the conditions of sewage disposal and protection of water supply existing at Chicago and within the limits of the Sanitary District; that after such experimentation and study, the said defendant The Sanitary District of Chicago adopted on or about the year 1919, a program and plan for the construction, installation and operation of works designed when operated to artificially purify sewage and wastes arising within the limits of the Sanitary District of Chicago, so there would be removed from sewage by the operation of said works substantially all or the greater amount of the impurities existing in the raw and natural sewage arising from the population within the limits of The Sanitary District; that said so-called scientific or artificial purification works provided to be constructed under said plan and program so adopted by said defendant, when operated, will so purify the natural sewage treated by said works, that there will be discharged from said works an effluent that will be innocuous and non-putrescible, and will not require the addition of fresh water for the purpose of oxidation; that said effluent, however, would not be fit or proper to be discharged into Lake Michigan, the drinking water supply of the population of Chicago and other cities and towns within the territory of said defendant District; and that it is not practically possible to construct works for the artificial purification of natural or raw sewage which when operated will have discharging from them an effluent so purified that it could be discharged into Lake Michigan, the drinking water supply as aforesaid; that the construction of the works provided for by the said plan or program adopted by defendant The Sanitary District in the year 1919, has gone forward as fast as such works could be physically built,

and the defendant The Sanitary District of Chicago has already expended in the construction of such artificial sewage disposal works, upwards of $39,000,000, and within the period of said permit of March 3, 1925, proposes to expend upwards of $55,000,000 upon the construction of such artificial sewage disposal works; that works have already been constructed and placed in operation under said plan and program, by which the sewage of upwards of 200,000 people has been, to a large extent treated and purified; and that the following table shows the expenditures made by the said defendant in the construction of its various channels, canals, so-called artificial sewage purification works and for other purposes:

COST OF CANAL SYSTEM AND APPURTENANCES TO DECEMBER 31, 1924.

Main Drainage Channel and Extension	$ 31,585,217.83
Chicago River Improvement	12,903,773.66
Desplaines River Improvement	2,333,571.72
North Shore Channel	4,138,105.25
Calumet-Sag Channel	14,159,215.51
Sewage Pumping Stations	980,622.76
Auxiliary Sewers	2,229,012.08
North Shore Sewers	2,453,996.55
Miscellaneous Construction	1,389,238.15
Bare Construction Cost	72,172,753.51
Administration, legal, clerical, etc., expense	5,729,813.46
Interest on bonds for construction	17,055,898.00
City of Chicago expenditures	6,706,804.37
Power house at Lockport	1,395,712.95
Total to December 31, 1924	$103,060,982.29

COST OF SEWAGE TREATMENT PROJECTS TO DECEMBER 31, 1924.

Sanitary improvements	$ 282,117.52
Desplaines River Project	3,357,669.23
Calumet Project	17,853,719.45
North Side Project	7,119,620.93
West Side Project	295,164.28
Miscellaneous Plants and Sewer	387,484.50
Bare Construction Cost	29,295,775.91
Administration, legal, clerical, etc., expense	2,325,799.06
Interest on Construction Bonds	6,923,188.71
Total cost for sewage treatment plants	$ 38,544,763.68

Twenty-first. This defendant denies that the diversion of water by way of said main channel has to any extent diminished the utility of the ports of Wisconsin, located on Lake Michigan, as enumerated in paragraph 4 in the amended bill, and this defendant denies that the diversion of water has reduced, by six inches in each or in any of said Lake Michigan ports along the shore of Wisconsin, the draft of vessels which can be accommodated therein for loading and unloading. On the contrary this defendant avers that at no time have vessels loading or unloading at said ports or intending to unload or load at said ports been hindered or will be hindered by said diversion so authorized. This defendant is not informed as to the percent of tonnage of freight received at said ports which consists of coal shipped from eastern states, and which coal, except for the amount consumed at the ports themselves, is then carried by rail to a large number of cities, villages and towns in the State of Wisconsin and in other states to the west of Wisconsin, and denies that said ports constitute the principal source of supply of coal for the State of Wisconsin in

its proprietary capacity as owner of many public buildings and institutions or for any other purpose, or for many thousands of individuals and industrial plants located in the said State, and therefore this defendant asks that the complainants be required to make strict proof of such allegations so far as said allegations may be material or relevant. This defendant is not informed as to the character or type of vessels that carry coal to said ports, or as to the amount of their carrying capacity, or the rates of freight that they are capable of being operated at when loaded to the maximum capacity, or to any other capacity, and therefore ask that strict proof be required so far as same may be material or relevant. This defendant admits that every inch of normal draft which vessels are unable to utilize reduces their cargo carrying capacity by a number of tons, provided the draft of such vessels is greater than depths of water in harbors or other waters sought to be navigated by them. This defendant avers that the diversion of water from the great lakes by means of the Sanitary District works has not in any way affected the draft which vessels entering said ports are able to utilize and that their cargo carrying capacity has not been, and is not, reduced because of any such diversion. This defendant further avers that the commerce described in paragraph 21 of said amended bill, is interstate commerce and is carried on, over and upon those navigable waters of the United States, over which the United States has, and has assumed, exclusive jurisdiction, and that the complainants herein have no right to complain of any supposed interference with said navigable waters of the United States. This defendant further avers that all of said harbors or ports described in said amended bill require, for their maintenance, constant dredging each year under normal conditions, and any dredging made necessary by virtue of any supposed

effect of said diversion upon said ports or harbors would be and is negligible and of no consequence, and this defendant avers that all of said harbors have been dredged and the channels improved by the United States Government since the opening of said Sanitary District channel and such dredging operations have been made under the supervision and direction of the United States and at the cost of the United States; and have been made upon the basis of the withdrawal of 10,000 cubic feet of water per second at Chicago, and that, therefore, the withdrawal of water at Chicago has not had any effect upon the navigable depth of water in said harbors.

Twenty-second. This defendant admits that in addition to the Wisconsin ports enumerated, located along the shore of Lake Michigan, there are a large number of ports located along the shores of Lake Michigan adjacent to the States of Illinois, Indiana and Michigan, on Lake Huron in the State of Michigan and the Dominion of Canada, on Lake Erie in the States of Michigan, Ohio, Pennsylvania and New York and the Dominion of Canada, and on Lake Ontario in the State of New York and the Dominion of Canada.

This defendant denies that the diversion of water from the Great Lakes by the Sanitary District works has caused or will cause a lessening of the utility of all or any of said ports on said lakes and of the waterways connecting said lakes in the same, or in any other, manner described with reference to the Wisconsin ports on Lake Michigan; that in the conduct of transportation between Wisconsin ports and the said ports in other states, the possible loading of vessels bound to or from such other ports, is reduced by many tons, or by any number of tons, because of said diversion. This defendant further denies that the diversion of water through the Sanitary District Works has affected or injured the traffic between

said States and the Wisconsin Ports of Superior, Ashland and Washburn, or either one of them, located on Lake Superior. This defendant is not informed as to the amount or character of the commodities carried by boats or vessels between said Wisconsin ports located on Lake Superior and the various ports located on Lakes Michigan, Huron, Erie and Ontario in other states, and in so far as such allegations may be material or relevant, this defendant asks that strict proof be required. This defendant denies that the said diversion of water through said Sanitary District Works has caused or will cause the loss of many millions of dollars, or any other sum of money, to the people of the State of Wisconsin, or any of the people of Wisconsin, or to the States of Minnesota, Ohio, Pennsylvania, or either one of them, or to any of the people of any of the said states, or to any other person whomsoever. This defendant avers that the commerce described in said paragraph 22 of said amended bill of complaint, is commerce carried on over and upon navigable waters of the United States, over which Congress has assumed and has exclusive jurisdiction; that the supposed injury and damage so alleged in said amended bill of complaint, concerns and relates to interference with navigable waters of which the said complainants have no right or jurisdiction to complain, and therefore this defendant moves that the said allegations in paragraph 22 of said amended bill of complaint be stricken, and that the said bill of complaint as to such allegations be dismissed.

Twenty-third. This defendant denies that the diversion of water, as aforesaid, has seriously impaired the navigability of the Chicago River; that a current has been introduced into said river so swift as to make the navigation thereof exceedingly difficult or dangerous, but on the contrary, this defendant avers that there is no cur-

rent in the Chicago River, or its branches, injurious to, or materially affecting, navigation thereon; that to properly provide for said diversion so that there would be no current injurious to, or materially affecting navigation upon said river, or its branches, defendant Sanitary District, pursuant to the authority of the Secretary of War, deepened, widened and straightened said river and its branches, and replaced old center pier bridges with a new and improved bascule type of bridge; that the said Chicago River and its south branch, and the West Fork was, before the Sanitary District improved same, narrow, tortuous and shallow, being at points less than 90 feet in width and only 17 feet deep over practically the entire course; that the said defendant has widened the said river and its branches so that it is now at all points, upwards of 200 feet in width, and it has deepened the channel of said river and its branches to 26 feet at all points; that in making said improvements said defendant expended upwards of $13,000,000.00, and that the Chicago River and its said branches, to the terminus of the said main channel of the Sanitary District is of such depth and width that the largest boats navigating the Great Lakes may traverse the course of said rivers, and the bridges across said rivers and its branches are so constructed that they may be moved out of the way of any boats desiring to pass. This defendant denies that said diversion has had any injurious effect whatsoever upon the commerce of said Chicago River and its branches, or has in any manner, or to any extent, reduced the tonnage carried thereon. This defendant further avers that no part of the Chicago River or its said branches has become entirely closed up by reason of said diversion, or has been made inaccessible to the commerce of the people of Wisconsin, or any other person or persons.

Twenty-fourth. This defendant admits that prior to the construction of the said canal of the Sanitary District

of Chicago, the Chicago, Desplaines and Illinois Rivers constituted navigable waterways extending from Lake Michigan on the east, to the Mississippi River on the West, and aver that the said rivers still are and always have been such navigable waterways, and that said canal forms an integral and essential part of such waterways. This defendant denies that in the construction of the said canal, defendant District materially modified or altered said navigable waterway by diverting certain portions of the Desplaines River from its original bed. This defendant denies that the said diversion has had any injurious effect upon the navigable capacity of the West Fork of the South Branch of the Chicago River. This defendant admits that said canal has become in fact a substitute for said old navigable waterway referred to in said amended bill, and that said canal is now the only practicable means of navigation by water from Lake Michigan to the Mississippi River.

This defendant avers in this connection that about the year 1848 the Illinois and Michigan Canal, constructed by the State of Illinois pursuant to Acts of Congress hereinbefore and hereinafter mentioned, extending from the West Fork of the South Branch of the Chicago River along the line of the waterway referred to in said amended bill, to and through the City of Joliet and along the Desplaines and Illinois River to the Illinois River at LaSalle, Illinois, took the place of the said old natural waterway referred to in said amended bill, and that the said Illinois and Michigan Canal, until the times hereinafter mentioned, was used and still is used solely for navigation and as a substitute for the said old natural waterway referred to. And this defendant avers that said canal of the Sanitary District has become a substitute also for the Illinois and Michigan Canal from Chicago to Joliet

and is now the only practical means of navigation between the Chicago River and the Illinois and Michigan Canal at Joliet; that that portion of the Illinois and Michigan Canal extending north from Joliet as originally constructed, is in its present state useless as a means of navigation on account of lack of sufficient water therein and because of various obstructions in the bed of said canal; that the portion of said Illinois and Michigan Canal extending from Joliet to the Illinois River at La Salle is, however, now used and operated for navigation purposes. And this defendant avers that since the construction of said main channel of said district, commerce has used the modern, complete and practicable waterway provided by the Sanitary District's main channel to the City of Joliet and the old Illinois and Michigan Canal to the Illinois River near LaSalle where it follows the Illinois River to the Mississippi; that said Canal of the Sanitary District is six times as deep and four times as wide as the old Illinois and Michigan canal as it existed, and as it was operated, prior to the completion of the main channel of the Sanitary District of Chicago. This defendant denies that it has always expressly, or in any manner, refused to concede that the said canal, thus substituted for the said waterway, is itself a navigable waterway of the United States; and this defendant further denies that under section 24 of the Act of 1889, quoted in paragraph 9 of said amended bill, or in any other manner, it has undertaken to bar the Government of the United States from all or any control or authority over said canal, as alleged in paragraph 24 of said amended bill, and further denies that it has undertaken to make the control and authority of said government subordinate to the use of said canal for sanitary and drainage purposes, or otherwise. But this defendant avers that the said Sanitary District canal

has been used and is now used and operated in such a manner as to make navigation thereon free, easy and convenient, that it serves all the purposes of navigation, and that the use for sanitation has not conflicted, and does not conflict, with the use for navigation, and that the use for sanitation has not impaired and does not impair the use for navigation.

This defendant further avers that the conditions provided for under said section 24 of said Act of 1889 have been modified by section 3 of said Act of May 14, 1903, in force July 1, 1903, as follows:

> "Said Sanitary District shall permit all watercraft navigating, or proposing to navigate said Illinois and Michigan Canal, to navigate the water of all said channels of said Sanitary District promptly, without delay, or payment of any tolls at locks, or charges for so navigating in said channel. The rules of the United States Government now in force regulating navigation on the Chicago River shall govern navigation on the channels of the Sanitary District of Chicago."

This defendant further avers that the matters and things complained of in paragraph 24 of said amended Bill of Complaint, relate to navigation upon the navigable waterways of the United States over which the United States has assumed and has exclusive jurisdiction, and concerning which the said complainants have no right or authority to complain.

Twenty-fifth. This defendant denies that the amount of water necessary to permit said canal to be operated for navigation purposes only, does not at the present time exceed 500 cubic feet per second, or that the amount of water which may in the future be required for the operation of said canal for navigation purposes only, if permitted to be operated for such purposes, will not exceed 1000 cubic feet per second. Upon the contrary, this

defendant avers that the amount of water required for navigation on said canal and upon the Illinois waterway (hereinafter described), extending from the southern terminus of said canal, along the Des Plaines River and on the Illinois River, is at least the amount authorized by said permit of March 3, 1925, which said amount of water can only be obtained from Lake Michigan by means of said canal.

Twenty-sixth. This defendant admits that paragraph 26 of the said amended Bill of Complaint contains correct and true copies of various documents, and permits, signed by the Secretary of War, Assistant Secretary of War or acting Secretary of War, upon the dates therein indicated.

This defendant denies the allegations of said amended Bill of Complaint to the effect that none of said documents mentioned in said Paragraph 26 are, or ever have been, of any force or effect as constituting an authorization for the said defendant to withdraw water from Lake Michigan; that the abstraction or diversion of water by said defendant has injuriously obstructed or affected the navigable capacity of Lake Michigan, or any other navigable water of the United States; that that the said abstraction or diversion of water has injuriously obstructed or in any manner affected the navigable capacity of the Chicago River by introducing a dangerously swift current into said river.

This defendant further denies the allegation of said amended Bill of Complaint concerning the authority given by said Rivers and Harbors Act of March 3, 1899, to the Secretary of War relating to the approval and placing of structures or other works in such manner as to affect the navigable capacity of navigable waters of the United States.

This defendant further denies the allegation to the effect that at no time since the 31st day of March, 1903, this defendant has been authorized by the Secretary of War to divert from Lake Michigan or to pass through the Chicago River, the Calumet River or both, into the canal of defendant District more than 4167 cubic feet of water per second; but, on the contrary, this defendant avers that said defendant District has been and is now authorized and directed by the Act of the State Legislature of 1889, hereinbefore referred to, to divert the amount of water required by said act, according to population of said defendant District and as now authorized by the United States. This defendant admits that the defendant District, has continuously, for more than ten years last past, been withdrawing from Lake Michigan and passing into said canal, an amount of water in excess of 4,167 cubic feet per second.

Twenty-seventh. This defendant further admits the allegations of paragraph 26 as to the suit instituted by the United States against defendant District and lately pending in the District Court of the United States, for the Northern District of Illinois, and decided in this court on appeal, January 5, 1925.

Twenty-eighth. This defendant admits that on the application of defendant District on March 3, 1925, Major General H. Taylor, Chief of Engineers, and the Honorable Joseph W. Weeks, Secretary of War, made and entered the order as set out on page 30 of paragraph 28 of said amended bill of complaint.

This defendant denies each and every of the averments contained in sub-paragraphs 1 to 6, inclusive, of paragraph 28 of said amended bill of complaint, and denies that the said Sanitary District of Chicago has violated or failed to keep any of the terms, provisions and conditions of the said permit of March 3, 1925, and avers

that the said Sanitary District of Chicago has at all times complied with all of the terms, provisions and conditions of said permit in every particular, and in this connection this defendant further avers:

(1) There has been no unreasonable interference with navigation by these defendants, or either one of them, by any work authorized by said permit.

(2) The expenses of the United States, connected with the inspections or with any other operations by the United States in the interests of navigation connected with the said permit, have all been paid.

(3) No attempt has been made by these defendants, or either one of them, to forbid the full and free use by the public of any navigable waters of the United States, and the channels of the defendant District and of the defendant State of Illinois have been at all times open to the full and free use of the public.

(4) The defendant Sanitary District has carried out and is carrying out a program of sewage treatment by artificial processes which will provide the equivalent of the complete 100 per cent treatment of the sewage of a human population of at least 1,200,000 before the expiration of said permit. At the time the said permit was issued, the defendant Sanitary District had expended on works for the treatment of sewage by artificial processes, the sum of $39,200,000, and was under contractual obligation for the expenditure of $9,700,000 additional for the same purpose; that at the time said permit was issued, the bonding capacity of the defendant District under the state law had been substantially exhausted. About June 19, 1925, through the efforts of the defendant District, the General Assembly of Illinois passed an act authorizing the increase of the bonding limit of defendant District from 3 to 4 per cent of the assessed valuation of property within defendant District, which said act

was in force June 19, 1925, and made available an additional amount through the issuance of bonds of approximately $19,650,000 for construction purposes. Between March 3, 1925, and December 3, 1925, defendant District awarded contracts for the sewage treatment projects, required under said permit, of $5,873,057.14, for dredging the Calumet River as authorized by the Secretary of War, being a part of treatment, diversion and navigation projects, approximately $1,080,000, and for the construction of bridges authorized by the Secretary of War, $1,437,707.63. During the said period from March 3, 1925, to December 3, 1925, the defendant District actually expended and paid out the sum of $7,521,590.59 on sewage treatment projects, and approximately $2,194,-708.54 on the construction of bridges, as authorized by the Secretary of War.

At the time of the issuance of said permit defendant District had in operation sewage treatment plants serving approximately 154,000 people, being equivalent to complete 100 per cent treatment of 87,000 people. The said program and plan for the construction of sewage treatment plants as mentioned in said permit has been approved by the United States Engineers and when built will provide for the complete treatment of the sewage of upwards of two million people, and the progress in the performance of the work of constructing said treatment plants under said program, has been such that the works provided by said program will be completed on or before December 31, 1929, the date of the expiration of said permit.

(5) The defendant Sanitary District, by order of its Board of Trustees, being the corporate authorities of said District under said Acts of 1889 and acts amendatory thereof and supplementary thereto, has agreed to pay its share of the cost of regulating or

compensating works to restore lake levels or compensate for the lowering of the Great Lakes system if and when constructed, and did on or before the 17th day of September, 1925, post and deposit and file with the Secretary of War a bond in the amount of one million dollars, which said bond was acceptable to and was received by the said Secretary of War.

(6) Upon the said permit of March 3, 1925, being issued, the defendant Sanitary District entered upon the preparation of plans for controlling works to prevent the discharge of the Chicago River into Lake Michigan in times of heavy storms, which plans it proposes to submit to the Chief of Engineers and the Secretary of War for their approval. The said plans are about completed, and are about ready to be submitted to the said Chief of Engineers and the Secretary of War. The construction of said controlling works will not require more than two years for their construction, and such plans will be submitted to and approved by the Chief of Engineers and Secretary of War and work commenced so that the work will be completed by the date of the expiration of said permit, as therein required.

(7) The United States District Engineer at Chicago has from time to time inspected the sewage treatment construction and has had supervision of the diversion of water from Lake Michigan, and the defendant District has carried out all directions and orders of the said engineer, and the said engineer has approved the said construction work and plans.

(8) The City of Chicago, at a meeting of the City Council of the City of Chicago on or about September 1, 1925, adopted a program for metering at least 90 per cent of its water service and provided for the execution of said program at the average rate of 10 per cent per annum, and such program so adopted was evidenced

by an ordinance duly adopted by the said City Council on said date. All of which was and is acceptable to the United States.

(9) Neither the Chief of Engineers nor the Secretary of War has suggested that sufficient progress has not been made at this date in the program of sewage treatment provided in said permit so as to insure full compliance with the provisions of condition 4 thereof, and these defendants show that such progress has been made so as to insure full compliance with said condition 4.

This defendant avers that the matters and things complained of in said paragraph 28 of said amended bill of complaint, relate to the permit of the Secretary of War of March 3, 1925, and that the complainants in said amended bill have no right or authority to complain as to whether or not defendant District has complied with said permit, and that such matters are within the exclusive jurisdiction of the United States.

Twenty-ninth. This defendant denies the allegation in said amended bill to the effect that the acts of defendant District in the diverting of water from Lake Michigan into the canal of the defendant District, have never been authorized by Congress, and deny that said acts are in violation of the legal rights of the States of Wisconsin, Minnesota, Ohio and Pennsylvania, and/or the people of said states.

(a) This defendant denies that, by the alleged acts, or by any other acts, it is interfering with the common law rights, if any there be, of the States of Wisconsin, Minnesota, Ohio and Pennsylvania, and/or its or their people, to have the free and unobstructed use of Lake Michigan and the various ports and harbors thereof, within or without the borders of said states, for the purposes of navigation, trade and commerce, or for any

other purpose, free from any and all interference with the natural navigable capacity of said lake or said harbors by any agency other than the States of Wisconsin, Minnesota, Ohio, Pennsylvania or the United States Government.

(b) This defendant denies that by any acts mentioned in the said amended bill of complaint, or by any other acts, is it interfering with the right, if any such right there be, of the people of Wisconsin, Minnesota, Ohio and Pennsylvania to the free and unobstructed navigation of Lakes Michigan, Huron, Erie, Ontario and the navigable waters between said lakes and from said lakes into the Mississippi River and the Atlantic Ocean, which rights, if any there be, belong to said people of Wisconsin, Minnesota, Ohio and Pennsylvania by the common law or by guarantee, if there be any common law right, or if there be any guarantee, contained in the ordinance for the government of the territory of the United States northwest of the Ohio River, enacted by Congress on June 13, 1787.

(c) This defendant denies that it is violating provisions of the Act of Congress of March 3, 1899, known as the Rivers & Harbors Act of 1899, or any of the provisions of said act, or any other act of Congress, and further that it is violating the provisions of Section 10 of said Act of March 3, 1899.

(d) And in this connection this defendant avers that it has not done or performed any act or thing interfering with said States of Wisconsin, Minnesota, Ohio and Pennsylvania, and/or their people, in the navigation of the waterways or any of the waterways mentioned in paragraph 29 of said amended bill, or in any other paragraph thereof, and that those matters and things relating to the navigation of the waterways mentioned in said amended bill are within the exclusive jurisdiction of the United States

concerning the regulation of which neither said complainants, nor any one of them, have any right to make complaint.

Thirtieth. This defendant admits that since the opening of said Sanitary District canal, the City of Chicago and other municipalities within said District, and the people thereof, and large industries located therein, have been permitted to drain into said Sanitary District canal the sewage and waste from the said municipalities and from said large industries; that this included domestic sewage and waste from a population of more than 3,300,000 inhabitants living within said District, and includes an additional industrial sewage and waste principally from the stockyards and other large industries, which latter sewage and waste has been estimated as equivalent of an additional population of about 1,500,000 and not of 1,800,000 as alleged in paragraph 30 of said amended bill; that the defendant the State of Illinois authorized defendant District to construct said canal for the purposes of navigation and also for the purpose of diverting sewage and waste by carrying the same into the Chicago, Desplaines, Illinois and Mississippi Rivers; but this defendant denies that the draining of said sewage and waste into the said Sanitary District Drainage Canal and carrying the same into said river, along with the amount of water authorized, and subject to the conditions imposed by the United States, has greatly polluted, is greatly polluting or will pollute the waters of said rivers, and, under such authority and conditions, has created, is creating or will create a highly offensive, unsanitary, disease breeding and pestilential condition in, upon or along the said navigable waterways from Lake Michigan through the Sanitary District Canal and the Chicago, Desplaines and Illinois Rivers into the Mississippi River, or, under such

authority and conditions, has made, is making or will make undesirable and largely impossible the use of said navigable rivers for passenger traffic either for business, recreation or pleasure, or, under such authority and conditions, has made, is making or will make such navigation offensive and dangerous to the health and lives of persons engaged in the conveyance by and over such waterways of freight and passengers. This defendant admits that there is a large amount of interchange of commodities and business between the territories adjacent to and served by, and which is or could be served by, navigation on said rivers and the States of Wisconsin, Minnesota, Ohio and Pennsylvania and the people thereof. This defendant denies that the condition of said waterways constitutes a public nuisance which impairs and violates the rights or any rights of the complainants and/or the people thereof, in the navigation of said rivers.

This defendant avers that the matters and things complained of in said paragraph 30 of the said amended bill of complaint, in so far as they relate to the alleged pollution of the waters of the Chicago, Desplaines and Illinois Rivers, are matters and things which lie entirely within the concurrent jurisdiction of the State of Illinois and the United States, about which complainants have no concern.

Thirty-first. This defendant denies that the legal rights of the States of Wisconsin, Minnesota, Ohio and Pennsylvania, or of their people, have been violated, and deny that said alleged acts of defendants, or either of them, are now causing or will cause any serious interference with the trade and commerce of the people of said states and of the States of Wisconsin, Minnesota, Ohio and Pennsylvania in their proprietary capacities, or otherwise, and deny that said alleged acts will result

in large or in any pecuniary losses to the said people, and deny that no adequate remedy exists at law.

Thirty-second. This defendant avers:

(a) The Continental Divide separating the watershed of the Great Lakes basin and the watershed of the Mississippi River basin, passes within approximately eight miles of the shore line of Lake Michigan at Chicago. Said Continental Divide at the point mentioned is insignificant and its summit is but a few feet above the mean surface elevation of Lake Michigan. Originally, in a state of nature, the West Fork of the South Branch of the Chicago River emptied into the South Branch of said Chicago River. Said South Branch in confluence with the North Branch formed the Chicago River. The West Fork of the South Branch passed within a short distance of the Desplaines River, and it in confluence with the Kankakee River forms the Illinois River which flows through a large and fertile valley and empties into the Mississippi. Originally at times the waters of the West Fork of the South Branch of the Chicago River flowed across the said Continental Divide and into the Desplaines River and mingled with the waters thereof. Prior to the admission of the State of Illinois into the Union in 1818, and subsequent thereto, said Lake Michigan, Chicago River, South Branch thereof and the West Fork of the South Branch, a small portage in dry weather times of the year across said Continental Divide, and said Desplaines and Illinois Rivers were navigated by the early explorers, fur traders and others, and formed a continuous line of water navigation accommodating a large and extensive commerce. In wet times or times of high water, the connection in said water route between the West Fork of the South Branch of the Chicago River and said

Desplaines River, was made through an expanse of water known as Mud or Portage Lake, and at such times boats passed to and from the Desplaines to the West Fork of the South Branch, entirely by water.

(b) The above mentioned water route between the Great Lakes and the Mississippi River and its connection with the Great Mississippi River Navigation System extending to the Gulf of Mexico, early determined the policy of the United States Government with reference to the division of the Northwest Territory. The cession of Virginia of 1783 provided that the Northwest Territory should be divided into states of not less than 100 square miles and not more than 150 square miles in area. A report made to and adopted by Congress, dated March 24, 1786, recommended the division to conform to the possibilities of navigation routes in the Northwest Territory, and among other things stated:

> "Whereas it appears * * * that the laying it out and forming it into states of the extent mentioned in the resolution of Congress of the tenth of October, 1780, and in one of the conditions contained in the cession of Virginia, will be productive of many and great inconveniences; that by such a division of the country, some of the new states will be deprived of the advantages of navigation, some will be improperly intersected by lakes, rivers and mountains, and some will contain too great a proportion of barren, unimproved land, and of consequence will not for many years if ever have sufficient number of inhabitants to form a respectable government, and entitle them to a seat and voice in the federal council: And whereas in fixing the limits and dimensions of the new states, due attention ought to be paid to natural boundaries and a variety of circumstances which will be pointed out by a more perfect knowledge of the country, so as to provide for the future growth and prosperity of each state, as well as for the accommodation and security of the first adventurers."

Pursuant to said report, article 5 of the Ordinance of 1787 was made to provide that the said Northwest Territory should be divided into not less than three nor more than five states, and that the northern boundary of three of said states might be fixed by Congress to be a line drawn through the southern bend or extreme of Lake Michigan, and that the territory north might be divided into one or two states, and, further, in contemplation of the importance of navigation, article 4 was by Congress made to provide

> "the navigable waters leading into the Mississippi and St. Lawrence and the carrying places between them, shall be common highways and forever free as well to the inhabitants of the said territory as to the citizens of the United States and those of any other states that may be admitted into the Confederacy, without any tax, impost or duty therefor."

The State of Virginia on December 30, 1788, ratified the said Ordinance of 1787. The Illinois Territory prior to the passage by Congress of the Enabling Act, only extended north to an east and west line drawn through the southern end of Lake Michigan. On April 3, 1818, when this Enabling Act was being considered by the House of Representatives in Committee of the Whole, the said act was amended, defining the boundaries of Illinois Territory, or of the new state, to be the boundaries as they exist today, and Mr. Pope in support of said amendment, among other things said (as shown by the proceedings of Congress):

> "The object of this amendment, Mr. P. said, was to gain, for the proposed State a coast on Lake Michigan. This would afford additional security to the perpetuity of the Union, inasmuch as the State would thereby be connected with the States of Indiana, Ohio, Pennsylvania and New York, through the Lakes. The facility of opening a canal between Lake Michigin and the Illinois River, said Mr. P.,

is acknowledged by every one who has visited the place, giving to the proposed State the port of Chicago (embraced in the proposed limits), will draw its attention to the opening of communication between the Illinois River and that place, and the improvement of that harbor."

(c) Shortly after Illinois became a State of the Union, a report was made by Graham and Phillips of April 4, 1819, and by Major Stephen H. Long, and transmitted to Congress by John C. Calhoun, Secretary of War, December 28, 1819, describing said water route from Lake Michigan to the Illinois River and recommending its improvement. The necessity of the improvement of said water route was further emphasized by the refusal of Great Britain to permit the citizens of the United States the free navigation of the St. Lawrence River, and the controversy as to the navigation of the St. Lawrence River extended from about the year 1822 until about the year 1854, when by treaty the privilege only was granted to the citizens of the United States. Consequently, on March 30, 1822, to authorize the construction of a canal to connect Lake Michigan with the Illinois River, Congress passed the following act:

"An Act to Authorize the State of Illinois to Open a Canal Through the Public Lands to Connect the Illinois River with Lake Michigan. (Approved and in force March 30, 1822.)

Section 1. Be it enacted by the Senate and the House of Representatives of the United States of America, in Congress Assembled: That the State of Illinois be, and is hereby authorized to survey and mark, through the public lands of the United States, the route of the canal connecting the Illinois River with the southern bend of Lake Michigan; and ninety feet of land on each side of said canal shall be forever reserved from any sale to be made by the United States, except in the cases hereinafter provided for, and the use thereof for-

ever shall be, and the same is hereby vested in the said State for a canal, and for no other purpose whatever; on condition, however, that if the said State does not survey and direct by law said canal to be opened, and return a complete map thereof to the treasury department, within three years from and after the passage of this act; or, if the said canal be not completed, suitable for navigation within twelve years thereafter; or, if said ground shall ever cease to be occupied by, and used for, a canal suitable for navigation; the reservation and grant hereby shall be void and of none effect; Provided, always, and it is hereby enacted and declared, that nothing in this act contained, or that shall be done in pursuance thereof, shall be deemed or construed to imply any obligation on the part of the United States to appropriate any money to defray the expenses of surveying or opening said canal; Provided, also, and it is hereby further enacted and declared, that the said canal, when completed, shall be and forever remain a public highway for the use of the Government of the United States, free from any toll or other charge whatever, for any property of the United States, or persons in their service passing through the same."

On or about January 20, 1825, Edward Coles, as Governor of Illinois, transmitted to James Monroe as President of the United States, a complete map showing the survey made by the State of Illinois for the location of the canal provided by said act. The letter accompanying the delivery of said map to the President of the United States, is in part as follows:

> "In compliance with request of the Legislature of this State, I have the honor to transmit to you a copy of the 'Report of the Canal Commissioners of the State of Illinois,' together with a map of the country between the headwaters of the Illinois River and Lake Michigan on which is delineated the proposed canal to connect these navigable waters."

The General Assembly of the State of Illinois had theretofore provided by law for the making of said sur-

vey by the Canal Commissioners and for the opening of said canal, and had within the three years provided by said act, performed all things required of it, and the said Act of March 30, 1822, has been since its passage and is now in full force and effect. The importance of constructing said canal was further called to the attention of Congress in a memorial by the General Assembly of Illinois in the year 1826, which, among other things, asked the United States to aid the State of Illinois to build said canal. Consequently, on March 2, 1827, for such purposes, the Congress of the United States passed an act, the title of which and the act are as follows:

> "An Act to grant a quantity of land to the State of Illinois for the purpose of aiding in opening a canal to connect the waters of the Illinois River with those of Lake Michigan. (Approved and in force March 2, 1827.)
>
> Section 1. Be it enacted by the Senate and House of Representatives of the United States of America, in Congress Assembled, That there be and hereby is granted to the State of Illinois, for the purpose of aiding the said State in opening a canal to unite the waters of the Illinois River with those of Lake Michigan, a quantity of land equal to one-half of five sections in width, on each side of said canal, and reserving each alternate section to the United States, to be selected by the Commissioner of the Land Office, under the direction of the President of the United States, from one end of the said canal to the other; and the said land shall be subject to the disposal of the Legislature of the said State, for the purpose aforesaid, and no other; *Provided, That the said canal when completed, shall be and forever remain a public highway for the use of the Government of the United States, free from any toll, or other charge, whatever, for any property of the United States, or persons in their service passing through the same;* Provided, That said canal shall be commenced within five years and completed in twenty years, or the State shall be bound to pay

> to the United States the amount of any lands previously sold, and that the title to purchasers under the State shall be valid."

Said act has been, since its passage, and is now, in full force and effect.

After surveys, investigation and reports made by engineers and others for the State of Illinois, on January 9, 1836, the General Assembly of Illinois passed an act providing for the construction of said canal, and under that act and certain acts amendatory thereof, the canal was finally completed in 1848. Section 16 of said act, among other things, provided:

> "Sec. 16 (Description-Proviso.) The said canal shall not be less than forty-five feet wide at the surface, thirty feet at the base and of sufficient depth to insure a navigation of at least four feet, to be suitable for ordinary canal boat navigation, to be supplied with water from Lake Michigan and such other sources as the Canal Commissioners may think proper, and to be constructed in the manner best calculated to promote the permanent interest of the country; reserving ninety feet on each side of said canal, to enlarge its capacity, whenever in the opinion of the Board of Canal Commissioners, the public good shall require it."

The original plan for the construction of said canal provided for its being so built that water for its operation would be taken from Lake Michigan by gravity through that portion of the canal which cut through the said Continental Divide. This plan was known as the Deep Cut Plan. For lack of funds, that portion of the canal between the West Fork of the South Branch of the Chicago River and the Desplaines River at or near Joliet, was completed upon what was called the Shallow Cut Plan, by which water for its operation was taken partly from said West Fork and partly by way of a

feeder known as the Calumet Feeder, extending from the said canal at Sag, Illinois, about twenty miles below its northern terminus, to the Little Calumet River, at or near what is now Blue Island, Illinois.

In 1861, the General Assembly of Illinois, with the view of enlarging the entire waterway from Lake Michigan to the Mississippi River, and to supply additional water for the Illinois River to provide greater depths for navigation in said river, passed a resolution directing the Trustees of the Illinois and Michigan Canal to make a survey and report as to the best methods of improving said waterway which should be supplied with water from Lake Michigan "through the enlargement and deepening of the Illinois and Michigan Canal, or otherwise, or by opening a channel from Lake Michigan, by way of the South Branch of the Chicago River and Mud Lake to the Desplaines River, and down said canal to a point that would secure a free, flowing, ample and never-failing supply of water, sufficient for the navigation of the Illinois River at all seasons and times." It was further provided by said resolution that the channel to be constructed should be of "sufficient size to admit of full and free steamboat navigation from the Illinois River to Chicago and Lake Michigan, as well as a size sufficient for supplying water for all the deficiencies of navigation in the Illinois River at all seasons." The said resolution contemplated either the enlargement of the Illinois and Michigan Canal in the stretch extending across the Continental Divide or the construction of an entirely new canal substantially parallel with it at such place and places to withdraw from Lake Michigan for navigation purposes a large quantity of water. This enlargement was provided for by both the Act of Congress of 1822, which reserved a strip of land 90 feet on

each side of the canal, and by the Act of Illinois, under which the canal was constructed, reserving the same number of feet on each side of the canal for the purpose of enlargement. In the furtherance of this plan for the enlargement of said waterway, the General Assembly of Illinois, on February 16, 1865, passed an act providing for the enlargement of said canal between Chicago and Joliet upon the original deep cut plan. The said Act is in part as follows:

"Whereas, it has been represented that the City of Chicago, in order to purify or cleanse Chicago River, by drawing a sufficient quantity of water from Lake Michigan, directly through it, and through the summit division of the Illinois and Michigan Canal, will advance a sufficient amount of funds to accomplish this desirable object; and, whereas, the original plan of the said canal was to cut down the summit so as to draw a supply of water for navigation directly from Lake Michigan, which plan was abandoned for the time being, after a large part of the work had been completed, only in consequence of the inability of the State to procure funds for its further prosecution; and, whereas, under the law creating the trust the plan of the summit division of the canal was changed, the level being raised so as to require the principal supply of water to be obtained through the Calumet feeder, subject to serious contingencies, and by pumping on to the summit with the hydraulic works at Bridgeport; now, therefore,

"Section 1. Be it Enacted By the People of The State of Illinois, Represented in the General Assembly, That to secure the completion of the summit division of the Illinois and Michigan Canal, upon the original 'deep cut' plan, with such modifications and changes of line, if necessary, as will most effectually secure the thorough cleansing or purification of the Chicago River, and facilitate the execution of the work, the City of Chicago, through its constituted authorities, may at once enter into an arrangement with the Board of Trustees of said

canal, with a view to the speedy accomplishment of the work."

Purusant to said Act of the General Assembly of Illinois last mentioned, the City of Chicago, pursuant to an ordinance of its City Council passed June 5, 1865, in 1871 completed said canal on said deep cut plan, whereby water was drawn for its operation and for the purpose of reversing the Chicago River at substantially all times of the year except in flood times. About the year 1872 Chicago was reimbursed by defendant, State of Illinois, for its expenditure of about $3,000,000 to complete said canal. The Congress, by its Rivers and Harbors Act of June 23, 1866, took cognizance of the desire and joined in the plan of the General Assembly of Illinois to enlarge said waterway—and the necessity therefor—by directing a survey to be made. Thereupon, on February 12, 1867, a report was made by the Engineer Corps of the United States Army known as the Report of General Wilson, which report was transmitted to Congress, concerning the improvement of this waterway. The report describes the waterway. Among other things, the said report stated:

> "* * * The data herein contained, together with the existence of a canal of limited capacity already in operation, demonstrate beyond a doubt that the waters of the lake may be carried into the Illinois River through a navigable channel of any required dimensions, and at a cost which cannot be regarded as excessive when the objects to be obtained are duly considered."

After the said Illinois and Michigan Canal had been completed by the City of Chicago upon the deep cut plan, a report was made on January 9, 1875, by Assistant Engineer F. C. Doran, which report was transmitted to Congress, and it recited the completion of said canal upon

the deep cut plan. This report was followed on May 10, 1880, by a report made by General Lydecker pursuant to the Rivers and Harbors Act of March 3, 1879, which said Lydecker report was submitted to Congress. Among other things, the said report stated:

"The question of a through line of water communication from the Mississippi to Lake Michigan, via the Illinois River, has been before Congress since an early date. In 1822, the State of Illinois was authorized to make through the public lands of the United States a route for a navigable canal connecting the Illinois River with Lake Michigan, and between that date and 1854, Congress had granted to the State 321,760 acres of land to assist in its construction. The canal was first opened to navigation in 1848, its cost up to that time being $6,409,509.95; since then the State has spent a great deal towards its enlargement and maintenance. In the meantime several surveys, having in view the improvement of the Illinois River, have been made, the first in 1838 by Capt. Howard Stansbury, Topographical Engineers; the next of any considerable importance was made under the direction of General J. H. Wilson, in 1866, the object of which was 'to obtain such specific and accurate information in regard to obstructions to navigation in that river as will enable you to submit estimates for its improvement, so that the largest boats navigating the Illinois and Michigan Canal, and steamboats drawing four feet of water, will be enabled to pass through the river to St. Louis during the season of extreme low water without breaking cargo.'

His report on this survey led Congress to direct a more complete survey in 1867 (act approved March 2), the object of which was to prepare plans and estimates 'for a system of navigation by way of the Illinois River, between the Mississippi and Lake Michigan, adapted to *military, naval,* and *commercial* purposes.' This duty was committed to a Board of Engineers composed of General J. H. Wilson and Mr. William Gooding, Civil Engineer, the latter having been for a long time the Chief Engineer of the

'Illinois and Michigan Canal.' The report of this board was submitted to the Chief of Engineers under date of December 17, 1867, and is published in his annual report for 1868, pages 438 to 468. It recommended that the Illinois River be improved by the construction of five locks and dams, creating thereby a slack water system with a navigable depth of 7 feet at the lowest stage, from the mouth of the river at Grafton to Utica, 227 miles above; the lock chambers were to be 350 feet long, 75 feet wide, and the estimated cost of the entire work was $1,953,600. To complete the through line to Lake Michigan, an enlargement of the canal was recommended, the estimated cost of this enlargement being, in round numbers, $16,250,000.

No appropriations were made by Congress to carry out the plan of improvement above indicated, but the State of Illinois, in substantial conformity with that plan, has constructed *two* of the proposed locks and dams (viz., at Henry and Copperas Creek), at a cost of $747,747, while the annual appropriations by Congress for improving the Illinois River (aggregating to date $589,150) have been applied mainly to ameliorating its navigable condition by dredging channels through the worst bars, and constructing dikes and wing-dams for contracting the waterway. For a more detailed description of these operations I would respectfully refer to my report dated August 30, 1878 (which was published as House Ex. Doc. No. 81, 45th Congress, 3rd Session), a copy of which is transmitted herewith.

The several surveys and reports above referred to gives so complete a description of the physical characteristics of the route, and present the arguments in favor of its improvement so forcibly, that it seems unnecessary to extend this report by repeating what has been so fully set forth before * * *.

* * * * *

The laws of Congress require that reports of surveys of rivers and harbors shall contain 'statements of all existing facts tending to show to what extent the general commerce of the country will be promoted by the several works of improvements con-

templated by such examinations and surveys. In fulfillment of this requirement it seems only necessary to note that the improvement of the Illinois River, supplemented by the enlargement of the Illinois and Michigan Canal as heretofore proposed, will furnish a reliable and commodious channel of water communication from the Mississippi River to the Northwestern lakes; by this means the vast Mississippi Valley, and all the country tributary thereto, is brought into direct water communication with Lake Michigan, at the great City of Chicago, with its flood of commerce eastward and westward; the route exists as a practicable one of considerable importance today, and the question is simply one of enhancing its value by increasing its capacity to a degree commensurate with the important interests involved.

* * * * *

Considering this simple statement, the facts so fully set forth in previous elaborate reports, and noting the wonderfully rapid development of the entire western country, it would seem that nothing further is necessary to indicate 'to what extent the general commerce of the country will be promoted' by the contemplated improvement, nor to show how desirable it is that the work should be accomplished with the least delay practicable.''

In 1881, the General Assembly of Illinois authorized the City of Chicago to install pumps at Bridgeport, the northern terminus of the Illinois and Michigan Canal. These pumps were installed by the City of Chicago about the year 1884, and thereby a larger quantity of water was taken from the West Fork of the South Branch of the Chicago River into and through said Illinois and Michigan Canal.

(d) The agitation for the enlargement of the waterway from Lake Michigan to the Illinois River continued; the necessity therefor was recognized by officials of the State and Federal Government; and, further, dur-

ing the decade beginning with 1880, there was a great demand for not only the enlargement of the waterway from Lake Michigan to the Illinois River, whereby a sufficient quantity of water would be withdrawn from Lake Michigan to provide a never-failing supply of water in the Illinois River, but also for the enlargement and deepening of the Mississippi River to the Gulf of Mexico, and organizations called "Deep Waterway Associations" were formed to further this project. The interest of the United States Government in the project is shown by the Acts of Congress and by reports of the Engineer Corps, transmitted to Congress. Major Benyaurd made two reports upon this subject—one dated September 2, 1882, and the other dated March 5, 1884, respectively, and Major Handbury, in 1887, pursuant to the Rivers and Harbors Act of August 5, 1886, made a report upon the same subject. Among other things, the said report of Major Handbury stated:

> "The United States and the State of Illinois have long been committed to the project of opening a water communication between the Mississippi River and the northern lakes of capacity sufficient for the wants of commerce and for the exigencies of our national defense, should these ever arise.
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> * * * * *
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> The distance by this route from the Gulf of Mexico to the southern end of Lake Michigan is about 1,620 miles. When the projected improvement of the Illinois River below Copperas Creek, on which we are now working, has been finished, more than 1,520 miles of this distance will be available for the water transportation of commerce in bulk between these points. Pushing this improvement through to the lake, the connecting link will be formed which will join the northern lakes with the vast network of navigable rivers whose waters flow commensurate with the importance of the commerce that will be affected by it. The mere fact that such a route is available will serve as a wholesome regu-

lator to the rates that would be exacted by other methods of transportation were this one not in existence. Besides the immense commercial advantages that may be expected from the completion of the project, there are military and naval exigencies that might easily arise where it would figure as a prominent factor in the problem of our national defenses. From whatever point we look at the subject there is nothing local or sectional in it. It is true that all the work to be done happens to be in the State of Illinois. The benefits to be derived belong to the nation at large. It is fortunate, too, that at this time the subject is unencumbered by any phase of a political character. The problem of connecting Lake Michigan with the Mississippi River by a commodious waterway, that could be used for commercial, military and naval purposes, has received attention from our most thoughtful statesmen from the day of Albert Gallatin to the present."

During the said decade beginning with the year 1880, the population of the City of Chicago and its adjoining suburbs had increased to approximately 1,000,000 people. While the Chicago River and its branches into which principally the sewage of Chicago was emptied, had been, since the enlargement of the Illinois and Michigan Canal upon the deep cut plan, to some extent cleansed by reason of said reversal of the Chicago River during dry weather times, nevertheless, the principal amount of the drainage of Chicago, including its sewage, found its way into Lake Michigan, which was the only drinking water supply for the people of Chicago. About the year 1885 a very extraordinary and extensive rain occurred during which, in a short time, a vast amount of water was delivered to the Chicago River from its drainage area, carrying into the lake and to the water supply an unusual amount of the accumulated sewage and filth deposited in the river. While on the occasion of rains a certain amount of the sewage and filth was washed into

the lake from the river, by reason of the fact that the Illinois and Michigan Canal was not of sufficient capacity to keep the Chicago River at all times reversed in its flow, this flood of 1885 caused an extraordinary large number of deaths from water-borne diseases—such as typhoid, and others—causing the people of Chicago and Illinois to be greatly alarmed.

The agitation and demand for a deep waterway to the Gulf and the health conditions at Chicago caused the City Council of Chicago, pursuant to an ordinance passed on January 27, 1886, to appoint a commission known as "The Drainage and Water Supply Commission," composed of the most eminent engineers of the United States, to make investigations and surveys and to report upon the best method of solving the waterway and water supply problems. The members of said Drainage and Water Supply Commission, after making complete investigation and survey, made a report to the City Council on January 30, 1887. The said report reviewed the conditions then existing as to drainage and water supply and the demands and the necessities for the enlargement of the waterway from Lake Michigan to the Mississippi River. An estimate was made by the said committee, as stated in its report, of the future population of Chicago and its environs. The said commission also considered, as shown by said report, the adaptation of the various then known means of disposing of sewage—among others, discharging the sewage into Lake Michigan at one end of the city and taking water from the lake at the other for drinking purposes, the disposal of the sewage on land and the diversion of the sewage and drainage to the Desplaines River by way of a canal, which would serve the purpose of providing a deep waterway from the West Fork of the South Branch of the Chicago River

to the Desplaines River at or near Joliet, and the use of the water from Lake Michigan to provide a never-failing water supply for navigation on the Illinois River and for the purpose of oxidizing the sewage and drainage so that such sewage and drainage, when passing through the Desplaines and Illinois Rivers, would not be injurious to the health of the people residing along the said rivers or to fish life therein. The commission recommended the diversion method mentioned as stated in its report as follows:

> "Besides the economical advantages of the Desplaines scheme, its superiority is still further emphasized by advantages of another kind. The proposed canal will, from its necessary dimensions and its regular discharge, produce a magnificent waterway between Chicago and the Mississippi River, suitable for navigation of boats having as much as 2,000 tons burden. It will establish an available water power between Lockport and Marseilles fully twice as large as that of the Mississippi River at Minneapolis, which will be of great commercial value to the State. The Calumet region will be much enhanced in value by having a direct navigable channel to the Desplaines River and by a lowering of the flood heights of Calumet Lake and River. Within the city the water of the Chicago River and its South Branch will get a much better circulation if it flows by gravity than if it has to be pumped, the necessity for which would remain even if the sewage should be discharged through intercepting sewers, either into the lake or upon land. Upon either of the latter conditions an occasional overflow from the sewers into the river during heavy rains would be more objectionable than a constant discharge of sewage into a more rapidly flowing stream. Flood waters entering the lake by way of the Chicago River would carry into it much filthy matter, either suspended or deposited, notwithstanding the existence of intercepting sewers, but the proposed diversion of such waters before reaching the populated districts will for all time obviate this undesirable occurrence.

Lowering the level of the North Branch at Bowmanville by its diversion to the lake will be equivalent to raising the low prairie extending towards Evanston and Niles and greatly benefit parts of these towns.

THE WATER SUPPLY.

In reaching the conclusion that the sewage of the city should be discharged into the Mississippi Valley the question of water supply is materially simplified, because the lake will then at all times furnish good water wherever intakes are desired for an extension of the works."

The subject-matter of the said report of the Drainage and Water Supply Commission of Chicago, above mentioned, was considered by the General Assembly of Illinois at its session held during the year 1887, but no act was passed. Instead, a committee of the House and Senate was appointed to make further investigations of the subject *ad interim* and to make a report to the 1889 session of the General Assembly. In the meantime, the agitation and demand for a deep waterway to the Gulf of Mexico of a depth not less than 14 feet, depths of 20 to 24 feet being proposed, increased, so that Congress provided in the Rivers and Harbors Act of August 11, 1888, for an engineering survey and report, as follows:

"And for the purpose of securing a continuous navigable waterway between Lake Michigan and the Mississippi River, having capacity and facilities adequate for the passage of the largest Mississippi River steamboats, and of naval vessels suitable for defense in time of war, the Secretary of War is authorized and directed to cause to be made the proper surveys, plans, and estimates for a channel improvement and locks and dams in the beds of the Illinois and Desplaines rivers from LaSalle to Lockport, so as to provide a navigable waterway, not less than one hundred and sixty feet wide, and

not less than fourteen feet deep, and to have surveyed and located a channel from Lockport to Lake Michigan, at or near the City of Chicago, such channel to be suitable for the purposes aforesaid; the necessary expenses of such surveys, estimates, plans and location to be paid out of the sum herein appropriated for the improvement of the Illinois River."

Thereafter, and in line with the general plan and program of the defendant, the State of Illinois, and the United States, to enlarge and complete the said Lakes-to-the-Gulf Waterway, the Act of May 29, 1889, was passed, providing for the creation of the defendant District and specifically providing that the canal to be constructed under and pursuant to the act should be of such dimensions and capacity to allow the passage along it of the largest boats, not only then navigating the Great Lakes, but such boats as would probably be used upon the Great Lakes in the future. And the said act provided also for the passage through the said canal from Lake Michigan of a sufficient quantity of water to provide a never-failing water supply for navigation. The said act also provided for the removal of dams constructed by the State in the Illinois River, intending thus to free the Illinois River of such obstructions and to provide free river navigation. The said act substantially carried out the recommendations of the said Drainage and Water Supply Commission concerning navigation between Lake Michigan and the Mississippi River, and relating the protection of the water supply for the people of Chicago. In providing for the construction of said works, the Drainage and Water Supply Commission, the committee above mentioned appointed by the Legislature to investigate and sit *ad interim* as above mentioned, and the General Assembly of Illinois, intended that the works to be constructed for navigation and incidentally to fur-

nish an outlet for the drainage and sewage arising at Chicago, should be of sufficient extent and size to take care of the conditions that might arise in the future.

At the time of the passage of said Act of 1889 making provision for the construction of said works, the General Assembly of Illinois understood that it was acting in pursuance of the Acts of Congress of March 30, 1822, and March 2, 1827, aforesaid, and the various other acts of Congress above mentioned, providing for surveys and reports upon the building of a deep waterway from Chicago to the Gulf of Mexico. At that time and for a great number of years thereafter, the sewage and drainage of metropolitan populations in the United States were disposed of by discharging the same into rivers and streams, wherein the sewage and drainage would be oxidized and purified by what is known as the dilution method of sewage disposal, and no other method was then known or used which could be adapted to the conditions at Chicago.

The said waterway policy of the State of Illinois, then immediately to be carried out under the said Act of May 29, 1889, and future then contemplated legislation, is indicated by the joint legislation of the House and Senate of said defendant State of Illinois, passed on May 28, 1889.

Among other things, the said resolution stated:

> "That it is the policy of the State of Illinois to procure the construction of a waterway of the greatest practicable depth and usefulness for navigation from Lake Michigan via the Desplaines and Illinois Rivers to the Mississippi River. * * * That the United States is requested to aid in the construction of a channel not less than 160 feet wide and 22 feet deep with such a grade as to give a velocity of 3 miles per hour from Lake Michigan at Chicago to Lake Joliet, a pool of the Desplaines

River, immediately below Joliet, and to project a channel of similar capacity and not less than 14 feet deep from Lake Joliet to LaSalle, all to be designed in such manner as to permit future development to a greater capacity."

(e) Immediately after the passage of said Act of 1889, the Sanitary District of Chicago was organized by vote of the people, and defendant District continued and completed the surveys for the Main Channel, known as the Sanitary and Ship Canal, extending parallel to and but a short distance from the Illinois and Michigan Canal from the West Fork of the South Branch of the Chicago River, twenty-eight miles, to Lockport, and construction of said canal was immediately commenced, and it was finally completed about the year 1898 with a depth of 24 feet, 160 feet wide in its rock sections and approximately 225 feet in width at the top in the earth sections, and the declivity was such that it was capable of passing through it pursuant to the express provisions of Section 23 of said Act of May 29, 1889, a maximum of 600,000 cubic feet of water per minute, or 10,000 cubic feet per second. Said volume of water was the amount then considered necessary and required for the construction and development of a deep waterway of the depths contemplated through and along the Desplaines and Illinois Rivers to the Mississippi River. The said volume of water is the amount now required for the Illinois Waterway now under construction and hereinafter more particularly mentioned. It was also contemplated that the said volume of water so to pass through said Sanitary and Ship Canal, would reverse at all times the flow of the Chicago River, thus preventing pollution of the water supply of the people of Chicago. At the time the said Sanitary and Ship Canal was laid out and projected, at the time of the passage of the said Act of May 29, 1889, and at the time

the construction work on said canal was commenced, it was contemplated and provided that the Chicago River, the South Branch and the West Fork thereof to the northern terminus of said Sanitary and Ship Canal, should be so deepened and widened that the necessary water could pass through same without creating a current injurious to navigation, and of a depth sufficient to accommodate vessels capable of navigating the Great Lakes and the said Sanitary and Ship Canal when constructed. Such intention to so improve the Chicago River and its branches mentioned, and the project therefor, was shown by resolution of the Board of Trustees of defendant district passed April 21, 1891, a copy of which was sent to the Secretary of War and the Congress of the United States. Pursuant to said resolution and other ordinances of said district and the authority of the United States and the State of Illinois, the said Chicago River, its South Branch and West Fork to the northern terminus of said Sanitary and Ship Canal, was deepened from 17 to 26 feet, widened at all points to 200 feet, obstructive center pier bridges were replaced with modern bascule type of bridges, also the bridges over the said Sanitary Ship Canal were built so that they could be moved or swung to permit the free passage of boats, the cost of enlarging Chicago River and its said branches being approximately $13,000,000. During the construction of said Sanitary and Ship Canal, the Congress of the United States was informed, each year, through the Chief of Engineer's reports of the progress of its construction.

Defendant District deepened and widened the South Branch of the Chicago River and the West Fork thereof to the northern terminus of the Sanitary and Ship Canal,

as above mentioned. The United States, pursuant to various acts of Congress passed beginning with the year 1892, deepened and widened the Chicago River proper to connect with the said improvement of the South Branch and said West Fork made, and then being carried out by the defendant District. Plans and specifications for the enlargement of said South Branch of the Chicago River were submitted to and approved by the Chief of Engineers and the Secretary of War, and permits were from time to time issued by said Chief of Engineers and Secretary of War authorizing said enlargement and improvement of said river.

May 8, 1899, the Secretary of War, by permit, authorized the opening of said canal and the withdrawal of water through it to its capacity, subject only to limitation of the volume of water in the event a current should be created in the Chicago River, the South Branch and West Fork, unreasonably obstructive to navigation thereon.

Thereupon, pursuant to said permit of May 8, 1899, defendant District, on January 17, 1900, placed in operation the Sanitary and Ship Canal.

At the southern terminus of said Sanitary and Ship Canal, locks have been constructed connecting it with the Illinois and Michigan Canal and with the Illinois Waterway now under construction, and the said Sanitary and Ship Canal has taken the place for navigation of the old Illinois and Michigan Canal between the West Fork of the South Branch and the southern terminus of said Sanitary and Ship Canal. Since the issuance of said permit of May 8, 1899, and the opening of said Sanitary and Ship Canal, appellant District has expended upwards of fifty million dollars in and about the deepening and widening of the South Branch and West Fork

of the South Branch of the Chicago River and in the construction and completion of intercepting sewers, pumping stations and diversion works supplementary to the Sanitary and Ship Canal, and in the construction of sewage purification and treatment works used in connection with the maintenance of said waterway.

The enlargement of the said South Branch of the Chicago River and the West Fork thereof, as made by defendant district and the enlargement of the Chicago River as made by the United States, has been such that the volume of water authorized by said permit of the Secretary of War of March 3, 1925, may be withdrawn from Lake Michigan through said river channels without creating a current in said rivers, interfering with navigation or objectionable to the Chief of Engineers and the Secretary of War.

(f) During the years beginning with the year 1899 when the said Sanitary and Ship Canal was completed, up to almost the present time, the Congress of the United States had passed many acts providing for surveys and reports to be made, and such surveys and reports have been made in relation to a deep waterway from the Great Lakes to the Gulf of Mexico, which waterway, according to those surveys and in accordance with the directions evpressly provided by acts of Congress, was to be built with the diversion from Lake Michigan to be used in its operation of at least the amount authorized by said permit of March 3, 1925, and also Congress provided for surveys and reports to be made, and such surveys and reports were made with reference to the construction of what are known as compensatory or regulatory works to be built at the outlets of various lakes for the purpose not only of offsetting for the theoretical effect of the diversion at Chicago, but also for the effect of diversions

from Lake Erie by way of the Welland Canal, New York Barge Canal and for power purposes at Niagara Falls.

All the reports made under all the said acts of Congress relating to the construction of compensating or regulating works, which reports were transmitted to Congress, find that the supposed lowering of the water surfaces of the Great Lakes system due to the said diversions, may be compensated for or offset by the construction of either fixed weirs or movable dams at the outlets of Lakes Huron, Erie and Ontario, and recommended that such works be installed. Defendant District a number of years ago offered to defray such expense to offset or compensate for the diversion at Chicago, and in accordance with the condition of said permit of March 3, 1925, it has posted a guarantee of a million dollars with the Secretary of War, as heretofore alleged.

The treaty of January 11, 1909, between the United States and Great Britain relating to Canadian boundary waters, provides that jurisdiction as to the diversions of water from Lake Michigan is reserved to the United States and the various states; that the treaty should have no effect upon diversions from said lake then existing; that the order of precedence of the uses of boundary waters should be:

(1) Uses for domestic and sanitary purposes;
(2) Uses for navigation, including service of canal for purpose of navigation;
(3) Uses for power and irrigation purposes.

Thirty-third: This defendant, further answering, says:

The construction of the said Sanitary and Ship Canal at the time it was projected and being constructed, was known as a great engineering feat, and when said canal was constructed it was the largest artificial canal in the world. The fact that said canal was to be and

was being constructed, was known to the people and officials of all the complainant states and to the people of the United States generally. Likewise was known to the same people and persons the purpose of the construction of said canal, namely, as the important link in the deep waterway to the Gulf of Mexico, furnishing by its operation water from Lake Michigan ultimately to its capacity, 10,000 cubic second feet, for the purpose of providing a water supply for the Illinois River and for the operation of the proposed enlarged waterway. The acts of Congress and the surveys and reports made thereunder with reference to the use of the Sanitary and Ship Canal and the water diverted by it for navigation and for sanitary purposes, were likewise known to the complainants and each of them. Yet no one of the said complainants, until the filing of the original bill of complaint herein, made any protest or complaint or instituted any suit with reference to the construction of said Sanitary and Ship Canal and its supplementary works, and permitted the defendant District to expend upwards of ninety millions of dollars in the construction of said works without any objection from said complainants, or either of them. And the said complainants, and each of them, have long acquiesced in the carrying out by these defendants of the plan and program herein mentioned for the construction of said waterway, and in the use of the waters to be diverted for navigation and for sanitary purposes, and are therefore estopped from obtaining any of the relief sought by said amended bill.

Wherefore, this defendant moves that this suit be dismissed because of the laches, acquiescence and estoppel above alleged.

Thirty-fourth: This defendant avers that pursuant to said Acts of Congress hereinabove mentioned, and to said waterway policy of the State of Illinois as ex-

pressed by resolutions and acts of its General Assembly, said General Assembly passed an Act entitled:

> "An Act in relation to the construction, operation and maintenance of a deep waterway from the water power plant of The Sanitary District of Chicago at or near Lockport, Illinois, to a point in the Illinois River at or near Utica, and for the development and utilization of the water power thereof;" approved June 17, 1919; in force July 1, 1919.

that under said Act the waterway to be constructed is to be known and called "The Illinois Waterway"; that said Act provided for the route of the said waterway, as stated in the title thereof, from the southern terminus of the Main Channel of the Sanitary District of Chicago at or near Lockport along the Desplaines and the Illinois Rivers to Utica on said latter named river; that the channel of the waterway is to be according to said Act not less than 150 feet bottom width and the minimum depth not less that 8 feet in the earth sections and 10 feet in the rock sections; that the minimum depth over mitre sills not less that 14 feet and minimum width of locks is to be not less that 110 feet with minimum length not less than 600 feet usable length; that the purpose of making the depth over mitre sills not less than the depth provided and the length and width of the locks as stated, was to permit of the enlargement of said waterway to a 14 foot depth; that the diversion of water from Lake Michigan to the amount provided for by said permit of March 3, 1925, is necessary for the operation of said waterway not only at the said depth of 14 feet, but also at the depth of 9 feet, which will be provided by the excavation for said waterway now being carried on; that said diversion to said amount will permit of the extension of said waterway from Utica on said Illinois River to its mouth, and thence along the Mississippi River to Cairo, Illinois, by the United States Government or by said State of Illinois, in conjunction with said Illinois

Waterway construction and said diversion to the amount of said permit is necessary for the construction and operation of said waterway through said Illinois River to the Mississippi River; that in addition, the use of said waters so diverted will permit of the removal of the state dams at Henry and Copperas Creek on the Illinois River and the government dams at Kampsville and La-Grange on the Illinois River, thus permitting navigation on said Illinois River from Utica to its mouth, to be free and unobstructed by locks or dams.

The plans of the State of Illinois for the construction of said Illinois Waterway from the southern terminus of the Sanitary and Ship Canal to the Illinois River at or near LaSalle, Illinois, have been approved by the Chief of Engineers and the Secretary of War, and permits for such construction have been issued by the Secretary of War. The defendant State of Illinois has, pursuant to amendment to its constitution and acts passed thereunder, issued the necessary bonds for the construction of said Illinois Waterway and has in such construction work built certain of the locks of the dimensions above described and has performed a vast amount of other work necessary for the construction of said waterway, and has at this time expended in the construction of said waterway, upwards of $3,000,000.

The said defendant State of Illinois has in the construction of said Illinois Waterway and the expenditure of said moneys therefor, constructed and completed the lock located at Marseilles, Illinois, in the Illinois River, of the dimensions above specified. The said lock provided to be built as above stated at the southern terminus of the Sanitary and Ship Canal to connect with the Illinois Waterway in the Desplaines River, is now 60 per cent completed, and will be entirely completed within the year 1926. Bids have been invited to be received Janu-

ary 6, 1926, for the letting of the contracts for the construction of the dam and lock at Starved Rock, in the Illinois River, of the size and dimensions above described, and the construction of retaining walls in the Desplaines River through the City of Joliet required to be built to carry out said plans for the construction of said Illinois Waterway. The remaining two dams, one at the mouth of the Desplaines River and the other at Brandon's Road Bridge, just south of the City of Joliet, across the Desplaines River, and each of the locks connected with the respective dams, will be placed under construction during the year 1926—all with the approval of and by the authority of, the United States.

Thirty-fifth. This defendant further answering says:

Upwards of forty years ago the defendant State of Illinois constructed two dams with locks in the Illinois River in the reaches of said river immediately south of La Salle, Illinois. One of said dams with its locks was constructed at Henry and the other at Copperas Creek, Illinois. The United States constructed two dams with locks in the lower reaches of the said Illinois River. One of said dams with its lock is located at Kampsville, and the other one is located with its lock at La Grange, Illinois. The United States and the said State of Illinois in constructing said dams, sought thereby to improve navigation in said Illinois River below La Salle, Illinois, for the purpose of enabling the maintenance by the United States and State of Illinois of at least seven feet in depth of water at all points in said river. About the same time, the United States constructed what is known as the Hennepin Canal, extending from the Illinois River at or near Bureau, to Rock Island, Illinois. The project depth of water in said canal for navigation was and is seven feet. Since the construction of the said Sanitary and Ship Canal and the placing of the same in operation,

with its diversion of water from Lake Michigan, the said United States and the said defendant State of Illinois, have sought to provide and to so improve navigable conditions upon said Illinois River below La Salle, Illinois, that navigation could be carried on on said river to its mouth without the use of the said dams and locks therein built as aforesaid. The addition to the Illinois River of the amount of water authorized by said permit of March 3, 1925, increases to a number of feet the depths of water in said river for the purposes of navigation, and said water insures better and greater depths for navigation. The said volume of water provided by said permit added to the said Illinois River, increases from three to five feet for navigation purposes the low water depths at the critical points of navigation or where the water is ordinarily shallow. During practically all of each year when navigation is carried on upon the Illinois River, the said additional water authorized by said permit makes it possible for boats navigating the said river to pass over said dams without being required to consume the time necessary in passing through the locks adjacent to said dams. Thereby navigation is greatly facilitated. The addition of said volume of water has made it possible and will make it possibe to maintain said project depths in said Illinois River without the expenditure of the amount of money for dredging that would be required if said volume of water authorized by said permit were not in said river. The said volume of water provided by said permit added to the Mississippi River below the mouth of said Illinois River, materially increases the navigable depths of water in said river, and insures and makes more easy the maintenance of the project depths fixed by the Congress of the United States for navigation in said river. From the mouth of the said Illinois River to Cairo, Illinois, the low water

depths in said Mississippi River are increased and will be increased thereby at low water times upwards of one foot, and in greater amounts at certain so-called critical points of navigation. The said volume of water also increases the depths for navigation in said Mississippi River at various points below Cairo, Illinois.

The natural run-off of the drainage area of the said Illinois River produces, when delivered to said Illinois River, variable volumes of water. At times the volume of water flowing in said Illinois River in a state of nature, did not exceed 500 cubic feet per second, and at times it has been known to be higher than 100,000 cubic feet per second. To maintain depths for navigation and insure such depths to persons navigating said Illinois River, it is necessary and required that a volume of water such as the amount authorized by said permit of the Secretary of War be added to the natural and ordinary flow in said river for and in the interest of navigation and interstate commerce. The said volume of water added when the run-off is great is but a small percentage of the total amount, but when the run-off is slight, said added volume from Lake Michigan provides better and greater depths for navigation than would exist if said volume of water were not turned into said Illinois River.

The addition of said volume of water, authorized by said permit, to the Desplaines River, also increases by upwards of one foot and a half, the project depth of water in said Illinois Waterway now under construction between the southern terminus of the Sanitary and Ship Canal to the Illinois River at La Salle, Illinois. It will not be practicable or feasible to construct and maintain a waterway from the southern terminus of the Sanitary and Ship Canal to the mouth of the Illinois River of nine feet depth to connect with waterways of similar depth in the Ohio River and in the Mississippi

River, without the use of substantially the volume of water authorized by said permit of March 3, 1925.

The amount of water authorized by said permit of March 3, 1925, improves and facilitates navigation and makes navigation more convenient upon the said waterway extending from Lake Michigan on the Chicago River, its South Branch and the West Fork of its South Branch, on the Sanitary and Ship Canal, on the Illinois and Michigan Canal and therefrom upon the Illinois River to the Mississippi River, and upon the Mississippi River substantially to its mouth.

Thirty-sixth. This defendant avers that in addition to the sewage and drainage of Chicago and its environments, being that arising within the limits of the territory of the defendant Sanitary District, there are many cities, towns and villages located upon the Desplaines and Illinois Rivers, such as Joliet, Morris, Ottawa, La Salle, Peru, Bureau, Peoria, Pekin and Beardstown, and many others whose sewage, drainage and wastes are discharged into said Desplaines and Illinois Rivers; that the volume of water authorized to be withdrawn, and under the conditions imposed, by said permit of March 3, 1925, is necessary and required for said Desplaines and Illinois Rivers, in order that the sewage, drainage and wastes now being discharged into said rivers, may be oxidized and diluted so that the said Illinois River may thereby be maintained in such condition that navigation may be carried on thereon conveniently and without injury to the health of the persons so navigating said river, and that fish life may be preserved in said river, and that the health of people residing along said rivers may not be injured; that the withdrawal of said water, in the amount and under the conditions provided by said permit, is required in order that navigation may be carried on upon the Chicago River, its North Branch, South Branch and

West Fork, and on the Sanitary and Ship Canal, without inconvenience or injury to the health of persons navigating same; that if the said volume of water were not withdrawn from Lake Michigan, or if an amount materially less than said volume were so withdrawn the said Chicago River, its North Branch, South Branch, West Fork, the Sanitary and Ship Canal, the Illinois and Michigan Canal, the Desplaines River and the Illinois River would be in such condition that noisome and disagreeable odors would arise therefrom, disease breeding conditions would exist, the health of people residing along same would be injured and navigation thereon could not be carried on with any convenience, if at all, and fish life in said Illinois River would be absolutely destroyed; that, furthermore, at times the Chicago River would flow into Lake Michigan, carrying with it its sewage and drainage pollution, polluting Lake Michigan, injuring navigation thereon and injuring the health of the people using Lake Michigan for a water supply; that within the period of said permit, to-wit, December 31, 1929, it would be impossible for the people residing within the limits of the defendant District or the people residing along the said Desplaines and Illinois Rivers, to so artificially treat or purify the sewage arising from said cities, towns and villages, that there would not be required to be withdrawn from Lake Michigan to the said Desplaines and Illinois Rivers substantially the amount fixed by said permit.

Thirty-seventh. This defendant avers that in issuing the said permit of March 3, 1925, the Secretary of War was acting pursuant to the authority granted by the Rivers and Harbors Act of March 3, 1899, in the regulation of interstate commerce and that the said Secretary's action in issuing said permit was pursuant to said act and was connected with the regulation of interstate commerce.

Thirty-eighth. This defendant further avers that the improvements made by the United States of said harbors mentioned in said amended bill, the original depth of water, the project depth as provided by the United States, and the present depth of water in said harbors, and other facts relating thereto are as follows:

WISCONSIN HARBORS.

Marinette Harbor.

Marinette, Wisconsin, is located across the Menominee River from Menominee, Michigan. Both cities, industrial plants and persons, firms and corporations desiring water communication or transportation use the Menominee River as their inner harbor. This river discharges into Green Bay, about 16 miles northwesterly from the mouth of Sturgeon Bay. The river is navigable only to a dam about two miles above its mouth. It is this portion that forms said inner or commercial harbor for said two cities. The United States has improved the inner harbor as well as the outer harbor by various works.

Originally, the outer harbor and the Menominee River were shallow, the depth of water therein being only a few feet. The first improvements made by the United States were conducted separately as to Menominee Harbor and Menominee River. The original project for the harbor was provided by the Act of Congress of March 3, 1871. Under this Act two parallel piers 400 feet art were constructed and a channel 13 feet deep was provided. The Act of Congress of September 19, 1890, provided for the increase of said depth to 15 feet and the Act of March 3, 1899 increased it to 18 feet. The Act of Congress of September 19, 1890, as modified by the Act of July 13, 1892, and by the Act of June 3, 1896, provided for

a project depth of channel of 15 feet, with a turning basin at the upper end of said commercial harbor. By the Act of Congress of June 13, 1902, the improvement of the harbor and river was consolidated and by the Act of March 4, 1913, the said harbor was improved to an 18-foot depth, including also a large portion of the inner harbor. The project depth of water, as provided by the acts of Congress for both the harbor and the river, so far as it is navigated, was and is 18 feet, which depth has been and is maintained. The total amount expended by the United States in the improvement of said harbor and river, to and including the year 1924, is the sum of approximately $552,820. Since the opening of the Sanitary District channel, January 17, 1900, there was expended in the improvement and maintenance of said harbor and river approximately the sum of $228,170.

Green Bay Harbor.

Said harbor comprises the Fox River, below De Pere, Wisconsin, a section about six and one-half miles long, discharging into the southern end of Green Bay, about one mile below the City of Green Bay, and an entrance channel about four and one-half miles long dredged through the shoals in the head of the bay from the river mouth to 19 feet depth in Lake Michigan. In the river, the lower three miles, extending through the City of Green Bay, is a naturally deep pool, requiring no improvement, and the upper three and one-half miles, thence to De Pere is a dredged channel connecting at its head with a turning basin at De Pere. Originally, and before the United States made improvements in this harbor, Green Bay was narrow and tortuous, with an available depth of about 10 feet, and the entrance was blocked by Grassy Island situated about one and one-half miles out from the river mouth. The improvement

was begun by the United States under a plan adopted by the Act of Congress of June 23, 1866. This Act provided for dredging an outer channel 11 feet deep, including a cut with revetted sides through Grassy Island. This project depth was increased by Act of Congress of June 23, 1874, to 13 feet, and by the Act of Congress of July 13, 1892 to 15 feet. The latter act also adopted a project for the inner channel for a depth of 11 feet, which was increased by the Act of Congress of June 3, 1896 to 15 feet. This work was completed in 1899. The Act of Congress of June 13, 1902, provided for the maintenance of the existing works and the 15-foot channel in Fox River below De Pere, and for a channel 18 feet deep from the mouth of Fox River to that depth in Green Bay. The Act of Congress of June 25, 1910, provided for a turning basin at the upper end of the river channel at De Pere to be 15 feet deep and of sufficient area to permit vessels not exceeding 350 feet in length to turn readily without the assistance of a tug. All this work was completed about the year 1910 and has been maintained to the project depths above mentioned and the actual depth of water has been and is the amount provided for by said improvement projects. The total expenditure made by the United States in the improvements above mentioned of the said harbor, to and including the year 1924, is approximately the sum of $945,078.39, of which amount $557,028.39 has been expended since the date of the opening of the Sanitary District main channel.

Sturgeon Bay Harbor.

Originally, and before the United States commenced improving this harbor, navigation was controlled by a depth of water of about eight feet over a shoal guarding the entrance to the harbor. Sturgeon Bay is entered

by means of the Sturgeon Bay and Lake Michigan Ship Canal. This canal is a revetted canal connecting Lake Michigan and Sturgeon Bay. A basin having an area of about 12 acres enclosed by breakwaters is located at the Lake Michigan end of the canal, and there is a dredged channel connecting the western end of the canal with deep water in Sturgeon Bay. The canal and connecting channel form a through waterway from Lake Michigan to Green Bay, Sturgeon Bay being an arm of the latter, and said canal thereby shortens the distance of vessels plying between Green Bay ports and those on the shores of Lake Michigan to the southward. The port and City of Sturgeon Bay is located on both sides of the bay about four miles northwesterly from the canal, the population of said city being about 4,500.

By an Act of Congress of April 10, 1866, 200,000 acres of public lands of the United States were granted to the State of Wisconsin for the purpose of aiding said State in constructing and completing a breakwater and harbor, and a ship canal connecting the waters of Green Bay with the waters of Lake Michigan. Sturgeon Bay and Lake Michigan Ship Canal and Harbor Company, organized pursuant to acts of the Legislature of Wisconsin, between 1872 and 1881, constructed a canal without locks or gates 7,200 feet long and 100 feet wide at water surface and 14 feet deep below mean level, and in continuation of the canal, dredged a channel in Sturgeon Bay 6,100 feet long of about the same dimensions as the canal. Works constituting what is known as a harbor of refuge at the Lake Michigan entrance to the canal were constructed by the United States. The River and Harbors Act of Congress of July 13, 1892, provided for the acquisition of the canal by the United States, pursuant to which the United States assumed control on or about April 25, 1893, and the United States paid for said canal

and works the sum approximately $81,333. By the Act of Congress of June 13, 1902, the canal and harbor of refuge projects were consolidated. The said Act of June 13, 1902 also provided for a depth in the canal and throughout the entire waterway of 19 feet—that is, from Lake Michigan through said canal into and throughout said Sturgeon Bay. This work was completed in 1904. The Act of March 2, 1919, provided for the formation of the turning basin near the westerly end of the revetted canal, and the work was completed in 1919. The present operations consist in maintaining the said works with a depth of 19 feet throughout. The United States has maintained and is maintaining the depth of water for navigation throughout said works at 19 feet and the actual depth of water has been and is said amount. The total expenditures made by the United States in the improvements above mentioned of the said harbor to and including the year 1924, is approximately $759,614.21, of which amount $444,281.21 has been expended since January 17, 1900. An additional operation expense up to and including March 4, 1915, of $396,559.61, has also been expended by the Government.

Algoma Harbor.

This harbor is at the mouth of the Ahnapee River. Originally, and before the United States entered upon the improvement of said harbor the depth of water at its entrance was three feet, and within the harbor about 500 feet from its entrance was a stone ledge with a depth of water over if of about four feet. The Acts of Congress of March 3, 1871, March 3, 1873, March 3, 1875, July 5, 1884 and March 3, 1899 provided for and resulted in the construction of two piers extending into Lake Michigan at the mouth of the river and the dredging of a channel 11 feet deep between the piers, extending ap-

proximately 1,500 feet inside the river mouth. The Act of March 2, 1907 provided for the construction of an outer harbor with a depth of 14 feet in the harbor and the channel above described between said piers and inside the river mouth. The present work of the Government consists in maintaining same. The depth of water is the project depth above mentioned, and is and has been maintained by the United States. The United States has expended in the construction and maintenance of its works in said harbor, approximately the sum of $359,777.21, of which sum $186,777.21 has been expended since the opening of The Sanitary District's main channel.

Kewaunee Harbor.

In 1880 the Kewaunee River flowed about due south toward Kewaunee, and made a sharp bend in Kewaunee and thence flowed northward parallel to Lake Michigan about 300 feet therefrom for a distance of about 2,000 feet to its mouth, which was about 25 feet wide and had a depth of about three feet. Under the Act of Congress of March 3, 1881, a channel 13 feet deep, the project depth, was cut through the above mentioned bend in said river and extended into Lake Michigan between parallel piers which form the present harbor entrance. The natural mouth of the river is closed and the part of the old river bed which led northward to the natural mouth is a portion of the inner harbor. This project was completed in 1898. Under the Act of Congress of June 25, 1910, the depth of water in said entrance channel was increased to 18 feet, with a turning basin of the same depth made by cutting off part of the point of land included between the old and the present river channels. Said depth of water has been and is maintained by the United States. The United States has

expended, in the construction and maintenance of said works, approximately the sum of $323,800, of which said sum approximately $173,800 has been expended since the opening of the Sanitary District channel in 1900.

Manitowoc Harbor.

This harbor is located at the mouth of the Manitowoc River. Originally, and before the United States improved said harbor, a bar over which there was only four feet of water, obstructed the entrance. The depth of water in the river for a short distance from its mouth was about 10 feet. Under the Act of Congress of August 30, 1852, two parallel piers were constructed extending into Lake Michigan on either side of the mouth of the Manitowoc River, and a channel between said piers approximately 10 feet deep was dredged to connect the said river and lake. Under the Acts of Congress of March 3, 1881, September 19, 1890, June 3, 1896 and June 13, 1902, the piers were extended and the channel depths were increased to 18 feet and a breakwater was also constructed 800 feet long. The entire project was completed in 1903. Under the Act of Congress of March 2, 1907, it was provided that the channel between said piers and up said river for a short distance should be maintained at 18 feet in depth, and under said act there was constructed a stilling basin at the harbor entrance. This was completed in 1910. The present work consists in the maintenance of said works. The United States has maintained and is maintaining the said harbor at the above mentioned project depth, and it has expended in the construction and maintenance of said works, approximately the sum of $1,062,060, of which said sum there has been expended, since the opening of the Sanitary District channel in 1900, the sum of $691,800.

Sheboygan Harbor.

This harbor is located at the mouth of the Sheboygan River. In its original condition the entrance to the harbor was guarded by a bar over which there was only three to four feet of water. Before the United States assumed control of said harbor, Sheboygan built two parallel piers 175 feet apart, extending into Lake Michigan at the mouth of the Sheboygan River, and it dredged a channel between them approximately 12 feet deep. Under the Acts of Congress of June 23, 1866, March 3, 1873, March 3, 1881, August 18, 1894, March 3, 1899 and June 13, 1902, the piers were extended several times, the width between them increased, the project depth increased by stages to 19 feet and a north breakwater was constructed 600 feet long. This work was completed in 1904. The Act of Congress of March 2, 1907, provided for maintaining a 19-foot channel and works between said breakwater and in said river and for extending the north breakwater shoreward; for building a south breakwater; and for removing the outer portions of the piers for the purpose of forming a stilling basin. This was completed in the year 1915. The United States is and has been maintaining said harbor works at said project depth and has expended in the construction and maintenance of said works approximately the sum of $1,091,268.12, of which amount it has expended since the opening of said drainage channel the sum of $696,819.21.

Port Washington Harbor.

This is an artificial "Y" shaped harbor consisting of a dredged and jettied entrance channel and two dredged basins. Prior to the time when the United States improved said harbor the depth of water was but a few feet. By the Acts of Congress of July 11, 1870,

and August 14, 1876, two parallel piers were constructed into the lake and two basins forming the present harbor were excavated inside the shore line and dredging between the piers and in the basin was done to a depth of 11 feet. This improvement was completed in 1895. By the Act of Congress of June 25, 1910, the project depth in the channel and basins was increased to 16 feet and the work of the United States is now confined to maintenance of said depth and works. The United States has maintained and is maintaining said project depth of water and has expended in the construction and maintenance to the year 1924 the sum of approximately $269,400, of which sum approximately $74,900 has been expended since the opening of said drainage channel.

Milwaukee Harbor.

The natural mouth of the Milwaukee River was about 3,000 feet southerly from the present artificial outlet and the depth of water at the mouth of said river prior to the time the United States improved said harbor was approximately 4½ feet. The said artificial outlet was formed by the construction of piers and dredging between them and thence through the low and narrow neck of land that separated the river and lake at this point. The Milwaukee River flowing down from the north is joined about five-eighths mile above the inner ends of the piers by the Menomonee River, entering from the west, and, about 3,000 feet south of the piers, where the natural mouth formerly discharged. The Kinnickinnic River empties from the south. The channels of said rivers are narrow, tortuous and not provided with turning basins; and navigation thereon is difficult. For a short distance in said river channels there has been maintained a depth and is now maintaining a depth of water of approximately 19 feet. The Act of Congress of

March 3, 1843, and the Act of Congress of August 30, 1852, provided for improving the original mouth by parallel piers and dredging and the formation of the jettied channel at the present outlet of 11 feet depth. The Act of April 10, 1869, provided for pier extensions. The Act of March 3, 1899, provided for the deepening of the channel between said piers and to the Milwaukee River to 19 feet as the project depth. The Act of Congress of March 2, 1907, provided for the maintenance of the 19-foot entrance channel to the said Milwaukee River, rebuilding certain piers and doing other work. This work was completed in 1910. The harbor of refuge was adopted by the United States under the Act of Congress of March 3, 1881. The breakwater for said harbor of refuge was extended under said Act of 1907, 1,000 feet south. The Act of June 13, 1902, consolidated the work on the project for the harbor of refuge with the project for the Milwaukee outer and inner harbors. The Acts of Congress of June 25, 1910, provides for the improvement of the river channels, construction of turning basins and the maintenance of all channels to 19 feet; also for the widening of the river channels. This work has not been completed owing to the failure of the City of Milwaukee to perform certain conditions necessary to make available the appropriation for said work by the United States. The United States has maintained and is maintaining said project depth of 19 feet in the said outer and inner harbors and has expended in the construction and maintenance of said works at said harbor the sum of approximately $3,979,475.36, of which said sum there has been expended by it $2,828,650 since the opening of the main channel of the Sanitary District.

Racine Harbor.

This harbor is located at the mouth of Root River. Originally the discharge of the river was variable and the depth of water at the lake outlet was from 2 to 3 feet, which was increased by freshets to approximately 7 feet, and at times there was absolute closure. Prior to the year 1844 local enterprise in participation with the United States government improved this harbor, which consisted of a channel approximately 10 feet deep between piers 160 feet apart. By the Act of Congress of June 23, 1866, the piers were extended and the channel between them was deepened to the project depth of 14 feet. By the Act of March 3, 1899, the channel was widened and the depth was increased to the project depth of 19 feet, and by the Act of June 13, 1902, a breakwater was constructed 600 feet long. The said projects were completed in 1905. The Acts of Congress of March 2, 1907, and June 25, 1910, provided for the maintenance of the 19-foot entrance channel and works incident thereto; for the formation of an outer harbor or wave-stilling basin by extending the old north breakwater to the shore line and removing the outer portion of the north pier, also for constructing a south concrete breakwater and removing the present south pier. Work upon the breakwater was commenced in 1916 and was completed in 1919. The United States is maintaining and has maintained the project depth of 19 feet in said harbor and channels and has expended in the construction and maintenance of said harbor approximately the sum of $1,329,742.21, of which said sum there has been expended $992,957.21 since the opening of the drainage channel.

Kenosha Harbor.

This harbor is located at the mouth of Pike Creek. Originally at the discharge of Pike Creek the depth of water was approximately 2 feet. By the Act of Congress of August 30, 1852, a channel 10 feet deep between two parallel piers 150 feet apart and said piers were constructed to the outlet of Pike Creek. By the Act of Congress of June 23, 1866, the depth of said channel was increased to 14 feet and by the Act of Congress of September 19, 1890, the basin or inner harbor was dredged to said depth. By the Act of Congress of March 3, 1899, the north pier to widen the channel was removed and rebuilt and the channel and basin was dredged to a depth of 19 feet and 18 feet, respectively; and, also, a breakwater 600 feet long was constructed. This work was completed in 1900. By the Act of Congress of March 2, 1907, the landward end of the breakwater was extended 200 feet and the maintenance of the 19 feet entrance channel and the basin 18 feet in depth was provided for. The United States has been and is maintaining the said project depth of water in said harbor and has expended in the said improvement the sum of approximately $681,807.41, of which said sum $382,500 has been expended since the opening of the drainage channel.

Superior Harbor or Bay.

The harbor of Duluth, Minnesota, and Superior, Wisconsin, have been for a number of years treated by the United States and Congress as one harbor. The work of improvement of the harbor of Duluth and Superior was combined as one project in the River and Harbor Act of Congress of June 3, 1896. Said harbor embraces all the navigable waters lying inside of Minnesota point

and along the fronts of the cities of Duluth and Superior and includes the Duluth Canal, Superior Entry, Superior Bay, Allouez Bay, St. Louis Bay, and St. Louis River, for a certain distance from its mouth. The bays were originally and before improvement expanses of shallow water with a general depth of only 8 to 9 feet. The United States began the improvement of Superior Entry in 1867 and its operations at Duluth in 1871. The Duluth Canal was cut through Minnesota point by the City of Duluth in 1870 and 1871 and in 1873 its maintenance and improvement were undertaken by the United States providing an inner harbor of easy access in place of the exterior harbor which was formed by breakwater theretofore constructed by the United States. The project of the United States of 1883 completed in 1887, provided 16 feet depth of water for navigation through the two entries in Duluth harbor basin and in channels paralleling dock lines of Superior and St. Louis Bays and up St. Louis River. The depth of water at some points has been and is maintained by the United States at 20 feet and at other points in said harbor the depth of water is greater. The United States has expended in the improvement of said harbor approximately the sum of $8,466,528, of which said sum there has been expended since the opening of the drainage channel approximately $5,661,695.

Ashland Harbor.

This harbor is located near the head of Chequamegon Bay. The natural depth of water in said harbor to the lower docks is approximately 19 feet. Under an Act of Congress passed, August 5, 1886, a breakwater was constructed and a channel was dredged along the dock front. In 1896 the United States established a harbor line along

the city front at a distance of approximately 2,000 feet from the shore line and in 1897 dredged a channel 20 feet deep outside the harbor line. In 1903 and in 1907 the United States extended said channel.

The depth of water provided by the improvement projects of the United States in said harbor is approximately 20 feet, which depth has been provided and is maintained by the United States. The United States has expended in the improvement and maintenance of said harbor works $683,500, of which said sum $444,000 has been expended since the opening of the drainage channel.

Washburn Harbor.

This harbor is located on the west side of Chequamegon Bay and about 4½ miles north of Ashland and is a part of Ashland harbor, and the depth of water in said harbor is less than that maintained in Ashland harbor, above mentioned. The depth of water in said harbor, as it now exists, has been created by the appropriations and expenditures made by the United States in dredging and improving said harbor.

MINNESOTA HARBORS.

Grand Marais.

This harbor is situated on the north shore of Lake Superior, 106 miles northeasterly from Duluth. It is a bay one-half mile long, and one-fourth mile wide, with a natural opening of 1,035 feet, reduced by breakwaters to 480 feet, and with an area of 61 acres. Originally there was a maximum depth of 14 feet over a very limited area, the general depth being from 8 to 9 feet at mean low water.

The existing project contemplates dredging an anchorage area of 26 acres to a depth of 16 feet, and certain other protected works. See River and Harbor Act of March 3, 1879 (H. Ex. Doc. No. 75, 43d Cong. 2d Sess.).

The United States has maintained and is maintaining said project at the depth of 16 feet and has expended in the construction and maintenance of said works at said harbor the sum of approximately $203,350, of which sum there has been expended by it $177,350 since the opening of the main channel of the Sanitary District.

Agate Bay.

This harbor is situated on the north shore of Lake Superior, 26 miles northeast from Duluth. It is a natural bay or indentation three-fourths of a mile long by one-half mile wide, protected by breakwaters. The original depth was ample for navigation, with 18 feet at mean low water, over the greater portion of its entire area of 109 acres.

The existing project was adopted by the River and Harbor Act of August 5, 1886 (H. Ex. Doc. No. 94, 48th Cong., 2d Sess.); the construction of two breakwater piers was approved by the Secretary of War January 4, 1887.

The United States has maintained and is maintaining said project of 18 feet in the said harbor and has expended in the construction and maintenance of said works the sum of approximately $275,708, of which said sum there has been expended by it $257,208 since the opening of the main channel of the Sanitary District.

OHIO HARBORS.

Toledo.

Toledo Harbor comprises the lower 7 miles of Maumee River and the channel about 9 miles long through Maumee Bay to Lake Erie, and has a width of from 650 to 1,800 feet in the river and of 400 feet in the bay. The harbor is located at the westerly end of Lake Erie, 99 miles westerly from Cleveland. Originally the general depth in Maume Bay was about 10 feet below low water datum, but frequent shoals with a minimum depth of 6.5 feet rendered navigation difficult. A well defined channel existed in Maumee River. For about 6 miles above the mouth of the river the minimum depth of this channel was 12 feet. Improvement projects were adopted by the River and Harbor Acts of June 23, 1866, July 5, 1884, August 5, 1886, July 13, 1892, and August 18, 1894, and the existing project adopted in 1899 provides for a channel 400 feet wide and 21 feet deep from deep water in Lake Erie through Maumee Bay and Maumee River to Fassett Street Bridge, a distance of 15 miles; thence 200 feet wide and 19 feet deep for a distance of 1 mile. Ordinary fluctuations of water level vary from 4 feet above to 2 feet below low-water datum, and extreme fluctuations, produced by winds and other causes, are from 9 feet above to 6.5 feet below that plane.

The existing project was adopted by the Act of March 3, 1899 (H. Doc. No. 198, 55th Cong. 2d Sess.).

The United States has been and is maintaining the said project depth of water in said harbor and has expended in the said improvement and its maintenance the sum of approximately $3,538,700, of which said sum $1,759,500 has been expended since the opening of the Drainage Channel.

Port Clinton.

Port Clinton Harbor comprises the lower half mile of the Portage River, which empties into Lake Erie at a point 72 miles westerly from Cleveland. It is from 200 to 300 feet wide. Originally the natural depths in the Portage River varied from about 10 feet near its mouth to 6 feet at Oak Harbor, about 12 miles above the mouth. The channel varied 50 to 150 feet. Prior to improvement little use was made of the river for navigation purposes, for the reason that its mouth was partially obstructed by a sand bar, over which the depth was variable, but seldom more than 5 feet.

The existing project adopted by River and Harbor Act of June, 1872, provides for the dredging of a channel to a depth of 10 feet and certain other collateral works. The United States has been and is maintaining said project depth of water in said harbor and has expended in said improvement the sum of approximately $109,089.69, of which said sum $17,089.69 has been expended since the opening of the Drainage Channel.

Sandusky.

Sandusky Harbor is located in the southeasterly portion of Sandusky Bay, a natural harbor some 22½ square miles in area, which opens into Lake Erie, and is 55 miles by water westerly from Cleveland. It comprises the channel through the outer bar and through the bay, a distance of about 3 miles, and along the city front, which is developed for a distance of about 1½ miles. Originally Sandusky Bay was generally about 10 feet deep below low-water datum, but shoal areas reduced the available depth for vessels approaching the city to a minimum of 7 feet. The existing project provided for

a channel 400 feet wide and 21 feet deep from deep water in Lake Erie through Sandusky Bay; reduced to a 20-foot depth and 300 feet width along the city front.

The existing project was adopted by the following River and Harbor Acts: March 3, 1899, March 2, 1919.

The United States is maintaining and has maintained project depth of 20 and 21 feet in this harbor and channel and has expended in the construction and maintenance of said harbor approximately $1,961,039.45, of which said sum there has been expended $1,345,847.45 since the opening of the Drainage Channel.

Huron Harbor.

Huron Harbor is located at the mouth of Huron River which flows into Lake Erie 47 miles by water westerly from Cleveland. It comprises the lower mile of Huron River, from 150 to 300 feet wide; an outer harbor somewhat triangular in shape, 14 acres in area, about 1,000 feet long and from 300 to 900 feet wide, and a channel of approach from deep water to the entrance between the pierheads, about 2,000 feet long and 300 feet wide. Natural depths in Huron River were about 18 feet below low water datum for about one mile above its mouth thence to Milan, the head of navigation, 10 miles above the mouth, there was an available depth of about 8 feet. The channel had a general width of about 100 feet. The mouth of the river was, however, closed by a sand bar, which prevented entrance during the greater part of the time. The present project provides for the dredging of an area of about 14 acres sheltered by a pier and jetty to a depth of 19 feet, and has been prosecuted under acts of Congress of March 3, 1905 and March 2, 1919.

The United States has been and is maintaining project

depth of 19 feet in Huron Harbor and has expended in construction and maintenance approximately the sum of $663,273.71, of which sum there has been expended $465,-862.33 since the opening of the Drainage Channel.

Vermilion.

Vermilion Harbor is located at the mouth of Vermilion River, which empties into Lake Erie at a point 37 miles by water westerly from Cleveland. It comprises the lower 3,000 feet of Vermilion River, which is about 125 feet wide, and a channel of approach from the lake about 500 feet long and 100 feet wide.

Only the lower reach of the river, about 1 mile in length had sufficient natural depth to accommodate even small craft. For about 3,000 feet above the mouth the river channel was 75 feet wide and from 6 to 10 feet deep below low-water datum, but the mouth itself was obstructed by a sand bar, over which the usual depth was about 2 feet. The existing project provides for dredging a channel to a depth of 12 feet below low-water between the piers and beyond them to deep water in the lake. This project was adopted by the following River and Harbor Acts, to-wit: July 4, 1836 and March 3, 1875, (authorizing 12 feet depth).

The United States has maintained and is maintaining project depth of 12 feet in said Harbor and channel and has expended in the construction and maintenance of said Harbor approximately $177,622.73, of which sum there has been expended $46,245.18 since the opening of the Drainage Channel.

Lorain.

Lorain Harbor is located at the mouth of Black River, which flows into Lake Erie 28 miles by water westerly from Cleveland. It comprises an outer harbor formed by

breakwaters, which is some 60 acres in area, about 1,900 feet long, with an average width of 1,450 feet, and the lower three miles of Black River, which is from 160 to 350 feet wide. Originally a natural channel about 100 feet wide and 8 to 13 deep below low-water datum extended from the mouth of the river upstream for about 3 miles. The mouth of the river was, however, obstructed by a sand bar, over which the depth was usually about 3 feet. The original improvement project was adopted by the River and Harbor Act of May 23, 1828, and the existing project by acts of March 3, 1899, March 2, 1907, and August 8, 1917, providing for an outer harbor about 60 acres in area formed by converging rubble-mound breakwaters and an entrance 500 feet wide between pier heads of timber cribs with concrete superstructure located at the outer ends of the breakwaters, and certain other works including dredging the outer harbor and channel 250 feet wide to a depth of 20 feet.

The United States is maintaining and has maintained project of 20 feet in said harbor and channel and has expended in the construction and maintenance of said harbor approximately the sum of $1,306,854.77, of which sum there has been expended $964,560.40 since the opening of the Drainage Channel.

Cleveland.

Cleveland Harbor is on the south shore of Lake Erie at the mouth of the Cuyahoga River, 176 miles by water southwesterly from Buffalo, N. Y. The harbor comprises the lower 5½ miles of Cuyahoga River, which is from 150 feet to 325 feet wide; the "Old River", which is about one mile long and an outer harbor formed by breakwaters, which is about five miles long and from 1,600 to 3,800 feet wide. The river near its mouth was about 15

feet deep at ordinary stage, but was obstructed by a sand bar over which a depth of about three feet only was available. The old mouth was about 700 feet west of the present outlet. Little use was made of the river for purposes of navigation. Improvements have been made under acts of Congress of March 3, 1825, June 23, 1866, March 3, 1875, August 5, 1886, and August 11, 1888, and the existing projects under acts of June 3, 1896, March 3, 1899, June 13, 1902, July 27, 1916, and August 8, 1917, providing for, among other things, the formation of an outer harbor 5 miles long and 1,600 to 2,000 feet wide, 19 feet deep, with provisional dredging to 23 feet. The River and Harbor Act of August 8, 1917, appropriated $5,000 to enable the United States to co-operate with the City of Cleveland in the preparation of final plans for the improvement of the Cuyahoga River, with the provision that the Government's share in the cost of improvement, in accordance with the final plans adopted, shall not exceed $400,000. (Final plans have not been adopted to July 1, 1924.)

The United States is maintaining and has maintained a project depth of 19 feet in said harbor and channel and has expended in the construction and maintenance of said harbor and works approximately the sum of $7,970,566.60, of which said sum there has been expended $5,397,899.83 since the opening of the Drainage Channel.

Fairport.

Fairport Harbor is located at the mouth of the Grand River, which empties into Lake Erie, 33 miles by water, easterly from Cleveland. It comprises an outer harbor some 40 acres in area, 1,600 feet long with a maximum width of 1,800 feet and an average width of 1,100 feet, and the lower mile of Grand River, which is from 180

to 300 feet wide. The outer harbor will be increased to 65 acres when work under the existing project is completed. The original channel in the Grand River extended about 2 miles above the mouth. It was 75 feet wide and 6 to 8 feet deep at low-water datum. The mouth of the river was, however, entirely closed by a sand bar during the greater part of each year.

The original project was adopted by the River and Harbor Act of March 3, 1825, and modified by the River and Harbor Act of May 20, 1826. The existing project calling for a harbor 19 feet deep was provided for in the Acts of March 3, 1905 and March 2, 1919.

The United States is maintaining and has maintained project depth of 19 feet in said harbor, and has expended in the construction and maintenance of said harbor approximately $1,459,275.08, of which said sum there has been expended $947,758.93 since the opening of the Drainage Channel.

Ashtabula.

Ashtabula Harbor is located at the mouth of Ashtabula River, which flows into Lake Erie, 59 miles by water easterly from Cleveland. It comprises the lower 1¾ miles of the river, which is from 150 to 300 feet wide, and an outer harbor protected by breakwaters, which is some 175 acres in area, about 3,600 feet long and 2,100 feet wide. In its natural condition the Ashtabula River was little suited to the requirements of navigation. A narrow channel with an available depth of 4 feet below low-water datum extended for about 2 miles above the month of the river, but the month itself was obstructed by a sand bar over which the depth was usually but 2 feet, overlying shale rock which was encountered at a minimum depth of 5 feet below low-water datum. The original project was adopted by the River and Harbor Act of May 20,

1826, and was modified by the River and Harbor Acts of March 3, 1829, July 3, 1832, March 2, 1867, June 10, 1872, March 3, 1881, and July 8, 1890. The existing project was adopted by acts of June 3, 1896, March 3, 1905, June 25, 1910, and March 2, 1919, which provides among other things for an outer harbor 20 feet in depth.

The United States is maintaining and has maintained project depth of 20 feet in said harbor and has expended in the construction and maintenance approximately the sum of $2,397,074.31, of which said sum there has been expended $560,106.40 since the opening of the Drainage Channel.

Conneaut.

Conneaut Harbor is located at the mouth of Conneaut River which flows into Lake Erie 73 miles by water easterly from Cleveland. It comprises the lower 300 feet of Conneaut River, which is from 200 to 400 feet wide, and an outer harbor some 200 acres in area formed by breakwaters. The outer harbor is about 4,000 feet long and 2,000 feet wide. Conneaut River was but little suited to the requirements of navigation. A channel about 13 feet deep below low-water datum and 75 feet wide extended for about one-half mile above the mouth of the river, but the mouth itself was obstructed by a sand bar over which the depth was usually about 2 feet. Improvements have been prosecuted under acts of March 2, 1829, July 13, 1892, February 24, 1893, and March 24, 1896. Later acts providing for an harbor 20 feet deep were adopted July 25, 1910, and August 8, 1917.

The United States is maintaining and has maintained project depth of 20 feet in said harbor, and has expended in construction and maintenance of said harbor approximately the sum of $1,966,865.59, of which said sum there has been expended $1,629,383.57 since the opening of the Drainage Channel.

PENNSYLVANIA HARBORS.

Erie.

Erie Harbor is located in Presque Isle Bay, formed by Presque Isle Peninsula, on the south shore of Lake Erie, 78 miles by lake westerly from Buffalo Harbor, N. Y. The Bay is 4½ miles long from east to west and 1 to 1½ miles wide, from north to south. The harbor basin is 2 miles long, one-half to 1½ miles wide, and 18 to 24 feet deep. The original harbor was nearly landlocked, the only entrance being at the eastern end and through a channel which was narrow, tortuous, and variable in position, with a depth of about 6 feet. The harbor has been developed under acts of March 26, 1824, March 2, 1867, August 5, 1886, September 19, 1890, March 3, 1899 and June 25, 1910, providing among other things for deepening the harbor basin over certain areas at the east and west ends to 20 feet, and the basin off the public dock to 18 feet.

The United States is maintaining and has maintained said depth of 18 feet to 20 feet in said harbor and channel, and has expended in the construction and maintenance of said harbor approximately the sum of $1,948,776.56, of which sum there has been expended $875,894.28, since the opening of the Drainage Channel.

(a) The facilities for navigation in said harbors have been provided by the United States under improvement projects specified by various Acts of Congress. The depth of water in all such harbors has been increased from time to time under said improvement projects, so that the project depth now maintained by the United States in each and every of said harbors is many feet greater than the original depth, and such improvements

in facilities of navigation, including width of channels, safety of entrance to harbors, depth of harbor basins and channels were all made solely and only at the expense of the United States, to which neither the complainants nor any of their people have directly contributed. The said facilities for navigation in the various forms mentioned have been provided by the United States to suit the demands of commerce in said harbors. Each and every one of said harbors has been improved in some of the various ways mentioned since said Sanitary and Ship Canal was opened. The United States, in making said improvements, determined the project depths for each of said harbors, and took into consideration, in so doing, effects upon the surface elevation of the water of Lake Michigan, if any there were or should be due to diversions of water for all purposes, at all points.

(b) The United States about the year 1894 provided for and caused the installation of certain works at the outlet of Lake Superior, whereby the out flow through the St. Mary's River has been controlled, and said out flow has at times been greatly diminished, thus causing a decrease in the supply of water to Lakes Michigan, Huron, Erie and Ontario. The United States has and has assumed jurisdiction of navigation and of the facilities for navigation upon the entire Great Lakes system by the various works and improvements that it has constructed, including said controlling works at the outlet of Lake Superior, and also by the improvement of the channels connecting the Great Lakes.

The Canadian Government with the consent of the United States, constructed at the Galops Rapids a dam known as the Gut Dam, whereby one of the channels of the St. Lawrence River was entirely cut off, thus causing the raising of the surface elevation of Lake

Ontario to an amount greater than the claimed lowering of the surface elevation of said lake due to the diversion of water at Chicago. Said dam was constructed about the year 1903.

The United States, in providing a complete system for navigation upon all of the Great Lakes, including their harbors and conecting channels, in addition to the matters above stated, has deepened at various points the St. Clair River, Lake St. Clair and the Detroit River, whereby the surface elevations of the waters of Lakes Michigan and Huron have been lowered upwards of one foot, that is, the surface elevation of the water of said lakes is upwards of one foot lower than it would have been had such improvements not been made, and to a certain extent thereby, the surface elevation of the waters of Lake Erie has been increased, and the United States has, in the interest of navigation, further permitted diversions from Lake Erie by way of the Welland Canal, to the extent of approximately 4.500 cubic second feet and from Lake Erie for the operation of the New York Barge Canal, of approximately 1,500 cubic second feet. The United States has permitted the use of waters at Niagara Falls for power purposes. The said uses of the waters of Lake Erie for navigation and power purposes mentioned, have decreased the ordinary surface elevation of Lake Erie an amount almost equal to the claimed effect of the Chicago diversion upon Lake Erie. In making the said improvements in navigation upon the Great Lakes system, the United States has changed, as above set forth, the ordinary and natural flow of rivers connecting said lakes, and thereby the ordinary surface elevations of the said lakes. The United States has expended upwards of one hundred and six million dollars in making said im-

provements and providing said system of navigation upon said Great Lakes, their harbors and connecting channels, and has assumed exclusive jurisdiction and control of navigation upon said Great Lakes and the harbors located thereon, including each and every of the harbors mentioned in said amended bill.

(c) As heretofore alleged, the United States has assumed jurisdiction in this matter and has provided for the building of compensating or regulatory works to offset, and compensate for, any such diversion, by inserting in the permit of March 3, 1925, a requirement that the defendant Sanitary District should file a bond for the cost of such regulating works and the defendant Sanitary District, has, as heretofore set out, executed and filed said bond in accordance with said permit, so that upon the completion of such regulating and controlling works there will be no lowering of the levels of said lakes, because of any diversion therefrom.

Thirty-ninth. This defendant denies that the complainants are entitled to the relief, or any part thereof, as in said amended bill of complaint demanded, and this defendant states that said amended bill of complaint is inadequate and insufficient in law and does not on its face entitle the said complainants to the relief, or any part thereof, prayed for in and by said amended bill of complaint; and this defendant furthermore moves that the amended bill of complaint be dismissed; and this defendant, as to each and every allegation of said amended bill of complaint not herein admitted, answered or specifically denied, hereby expressly denies the same; and this defendant prays the same advantage in this answer as if it had pleaded or demurred to said amended bill of complaint, and prays that it be dismissed with its

reasonable costs and charges in this behalf most wrongfully sustained.

SANITARY DISTRICT OF CHICAGO,

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Its Solicitors.